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AEROSPACE MEDICINE AND BIOLOGY

Formerly: Aviation Medicine

AN ANNOTATED BIBLIOGRAPHY

VOLUME VI

1957 LITERATURE,

by

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PREFACE

Volume VI follows the preceding volume in all aspects -- format arrangement, types of index, and structure of abstracts. The breakdown in subject categories, which was initiated in Volume V and has met with great acclaim by the readers, has been continued with minor modifications. The subject index has been expanded by another thousand entries, and special consideration has been given to new areas of interest that have emerged while work was in progress.

We wish to take this opportunity to thank the representatives of the agencies sponsoring this project, particularly Messrs. M. S. Day and H. E. Sauter of the National Aeronautics and Space Administration, Colonel J. Bollerud of the US Air Force, Dr. H. Wooster and Mrs. R. Swanson of the USAF Office of Scientific Research, and Mr. H. B. Lawson of the Federal Aviation Agency. We also should like to express our appreciation to Gen. D. Flickinger, Dr. W. J. Kennard, and Dr. S. F. Seeley of the Aerospace Medical Association for the assistance and counsel they have given us. Special thanks are due to the members of the staff of ASTIA and of the National Library of Medicine for their help in securing materials for the bibliography. And finally we wish to acknowledge the assistance rendered by our own staff members, particularly Miss M. F. Dunsmore, Mr. N. Greenhouse, and Mrs. V. Sammons.

ABBREVIATIONS

A. JOURNAL TITLES

The abbreviations used herein for journal titles are intended to save space without sacrificing ready recognition. Minor words such as articles and prepositions, and occasionally parts of long titles have been omitted, and the words and names occurring most frequently in titles are abbreviated. The following is a key to the title word abbreviations used:

Acad.	Academy	Jour.	Journal
Acoust.	Acoustic		
Aeronaut.	Aeronautical	Lab(s).	Laboratory(-ies)
Amer.	America(n)	Laryngol.	Laryngology
Arch.	Archives		
Assoc.	Association	Mag.	Magazine
		Med.	Medicine, Medical
Bacteriol.	Bacteriology		
Brit.	British	Nat.	National
Bull.	Bulletin		
		Ophthalmol.	Ophthalmology
Canad.	Canadian	Otol.	Otology
Coll.	College	Otolaryngol.	Otolaryngology
Compar.	Comparative		
Corp.	Corporation	Pathol.	Pathology
		Physiol.	Physiology
Dept.	Department	Proc.	Proceedings
Dermatol.	Dermatology	Psychol.	Psychology
Div.	Division		
		Quart.	Quarterly
Elec.	Electrical		
Endocrinol.	Endocrinology	Rev.	Review
Eng.	Engineering		
Exper.	Experimental	Sci.	Science
		Scient.	Scientific
Gaz.	Gazette	Soc.	Society
Gynecol.	Gynecology	Surg.	Surgery
Hyg.	Hygiene	Tech.	Technical
Inc.	Incorporated	Univ.	University
Indus.	Industrial		
Inst.	Institute		

B. AVAILABILITY SYMBOLS

As in the preceding volume, availability of materials is indicated by library or report-collection symbols (in capital letters), followed by a control number. The symbols are as follows:

*AD	<u>ASTIA Document: available at ASTIA (Armed Services Technical Information Agency), Arlington Hall Station, Arlington 12, Virginia.</u>
DLC	<u>Library of Congress, Washington 25, D. C.</u>
DLC-Sci	<u>Library of Congress, Science and Technology Division, Washington 25, D. C.</u>
DNLM	<u>National Library of Medicine, Washington 25, D. C. (formerly Library of the Surgeon General [DSG], then Armed Forces Medical Library [DAFM]).</u>
DP	<u>Patent Office Library, Washington, D. C.</u>
PB	<u>Publication Board: for sale by the Office Of Technical Services, Department of Commerce, Washington 25, D. C.</u>

*) Available on loan to members and contractors of the Department of Defense only.

BIBLIOGRAPHY

1. GENERAL ASPECTS

a. General

6702

Armstrong, H. A.

[ULTIMATE OBJECTIVES OF MILITARY AVIATION MEDICINE] Objectifs ultimes de la médecine aéronautique militaire.—Force aérienne, Service de santé, Bulletin technique d'information [Bruxelles], 1957 (Aug): 1-5. In French. DNLN

Military aviation medicine is concerned with the selection and control of pilots and other flying personnel not only from the standpoint of their health and life, but also to preserve the nations arms and materiel from destruction during aircraft accidents due to medical causes. In addition, by keeping the pilot in good physical condition, he can respond to a national emergency effectively.

6703

Arnold, K.

[MEDICAL PROBLEMS OF SPACE FLIGHT] Medizinische Probleme des Raumfluges.—Ärztliche Mitteilungen (Köln), 42 (34): 1037-1039. Dec. 1, 1957. In German. DNLN

The dangers confronting man in space flight are reviewed. As chief problem areas are recognized: (1) reproduction of atmospheric conditions compatible with life in the space ship; (2) acceleration and deceleration stresses to which the organism is exposed at the blast off, navigation, and reentry; (3) weightlessness; (4) sudden explosive decompression in case of being hit by a meteorite; (5) biological effects of cosmic radiation; (6) direct hits by cosmic dust, (7) psychological problems in longer space flights.

6704

Ashe, W. F.

AVIATION MEDICINE.—Medicina del trabajo (Buenos Aires), 22 (178): 618-621. Nov. 1957. In English. DNLN

The physical, biological, chemical, psychological, and sociological stresses of flying are briefly discussed. Mention is made of the deficiencies found in civil aviation medicine with regard to pilot physical

standards, ground and tower operation control personnel, and passenger comfort and safety.

6705

Barron, C. I.

THE POTENTIALS OF AVIATION MEDICINE IN THE AIRFRAME MANUFACTURING INDUSTRY.—Jour. Aviation Med., 28 (4): 370-373. August 1957. DLC (RC1050.A36, v. 28)

Many of the responsibilities of the staff medical director parallel those of the military flight surgeon in the conduct of physical examinations, health maintenance of flight crews, physiologic indoctrination, and aviation hygiene and toxicology. Human factors teams have proved to be an effective approach to the solution of bio-engineering problems. In seeking constantly for new knowledge, aeromedical specialists in the airframe industry have established broad intercompany relations and maintain liaison with civil and military practitioners and research workers in aviation medicine. (From the author's summary)

6706

Beard, R. B.,

and A. C. Rotherham

SPACE FLIGHT AND SATELLITE VEHICLES.—150 p. London: George Newnes Limited, 1957.

DLC (TL790.B36)

The following topics are listed in the table of contents of this book: (1) a historical survey of the development towards space flight; (2) basic principles; (3) methods of achieving space flight; (4) the present position; (5) prospects for the immediate future; (6) uses of satellite vehicles; (7) space flight—"why" and "when"; and (8) the far future. Also included are representative plates, a bibliography, and an index.

6707

Bergeret, P.

[PHYSIOPATHOLOGY OF THE AVIATOR] Physiopathologie de l'aviateur.—In: H. Desoille, Cours de médecine du travail, vol. 2, p. 75-106. 1957. In French. DNLN (WA400.D467c, v. 2)

During high-altitude flight, general atmospheric depression may produce aerotitis media, barotraumatic sinusitis, meteorism, and aero-embolism; and low oxygen partial pressure, anoxemia and hypocapnia. Accelerations, or those of flight maneuvers, parachute jumps, seat ejections, and the weightless state may be responsible for cardiovascular and labyrinthine disorders, and nasopharyngeal and craniovertebral lesions. Aviators are also exposed to the additional hazards of temperature variations, noise, vibrations, ultrasonic, solar, and cosmic rays, and to carbon dioxide and other volatile products emitted by engines. Protection from the hazards of altitude is advocated by means of pressurized cabins and clothing; against accelerations, by the g suit; and in general by proper medico-physiological selection and training procedures. Included are representative tables of the general medical standards required for students, pilots, and other aviation specialties.

6708

Burgess, E.

SATELLITES AND SPACE FLIGHT.—159 p. New York: Macmillan Co., 1957. DLC (TL790.B8)

This book attempts to show how the Earth-satellite program has become possible due to developments in military rockets and how it can lead to interplanetary probe missiles. The basic conditions for manned missions are discussed and suggestions made concerning methods whereby interplanetary flight might be achieved. The following chapters are listed in the table of contents: instrumented satellites, station in space, probing into space, expedition to the moon, the lunar base, and interplanetary flight. Representative figures are included.

6709

Campbell, P. A.

AEROMEDICAL AND BIOLOGICAL CONSIDERATIONS OF FLIGHT ABOVE THE ATMOSPHERE.—In: *Realities of space travel*, p. 251-265. Ed. by L. J. Carter. London: Putnam, 1957. DLC (TL790.A1B718)

Same as item no. 3923, vol. IV (1955).

6710

Christian, G. L.

SCIENTISTS DISAGREE ON MAN'S SPACE ROLE.—*Aviation Week*, 67 (24): 61-64. Dec. 16, 1957. DLC (TL501.A8, v. 67)

Disagreements between human factors specialists and systems engineers are presented on the role of man in manned space flight. A six-man panel, conducted as though it were a preliminary design team considering the problem of developing a control system for a manned space ship, led the symposium. The human factors group wants to keep man awake, alert, and active during his roundtrip to such destinations as the Moon and Mars. Systems engineers prefer to put man to sleep during his voyage through outer space and feed him intravenously if the trip length requires it. Various proposals and rebuttals from both sides are presented of similarities and differences of control systems of manned and unmanned space ships. A proposal that a space ship should have four subsystems is presented and some environmental variables totally or almost totally outside of man's experience on earth are summarized.

6711

Graybiel, A.

FUTURE TRENDS IN MILITARY AVIATION MEDICINE.—*Military Med.*, 120 (5): 347-363. May 1957. DLC (RD1.A7, v. 120)

Aeromedical problems of the future will be determined by the type of craft used and the nature of the mission to be flown. With the advent of space craft and rocket planes problems will develop which are caused by the stresses of high altitude, high speed, accelerations, and weightlessness. These stresses are briefly reviewed. The broader concept of aeromedical responsibilities will include not only the clinical aspects of aviation medicine but also the concern for the professional qualifications of the pilot.

6712

Hersey, I.

DOG IN SPACE.—*Astronautics*, 2 (5): 30-31, 84. Dec. 1957. DLC (TL787.A8, v. 2)

The launching of a 1120 pound Sputnik II satellite carrying a dog is discussed. Aside from the data which the satellite can accumulate at very high altitudes, studies of the dog may produce significant information about cosmic ray effects and weightlessness once it is successfully returned to earth. The experiments involving the dog are largely physiological, and directed toward learning the mechanics of protecting living beings in space.

6713

Jongbloed, J.

ALLOCUTION.—In: *The first European congress of aviation medicine*, p. 7-19. *Aeromedica acta* (Soesterberg, Netherlands), Special edition, 1957. In Dutch, French, and English. DNLM

This address was delivered at the First European Congress of Aviation Medicine, 's-Gravenhage, Netherlands, October 3, 1956. The problems to be solved in aviation medicine in the future are summarized. The differential needs of civil and military aviation are pointed out in regard to crew selection, design and equipment of the airplane, cabin environment, work-rest schedules, and retirement age. In space medicine physiological and psychological problems have to be anticipated and solved before the actual flight.

6714

Kothari, D. S.

AVIATION MEDICINE RESEARCH.—*Aero Med. Soc. Jour. (New Delhi)*, 4 (1): 1-3. Dec. 1957. DNLM

A brief outline is presented of the research problems in aviation medicine which deal with acceleration, oxygen regulators, altimeter design, vision, and perception.

6715

MAN IN SPACE.—*British Med. Jour. (London)*, no. 5052: 1041-1042. Nov. 2, 1957.

DLC (R31.B93, no. 5052)

The possibility of human space travel is discussed in general. The hazards and problems of space travel (confinement, acceleration, barometric pressure, radiations, meteorites, food, re-entry problems) and possible means of overcoming them are briefly considered.

- 6716
MAN ON THE MOON. — Brit. Med. Jour. (London),
 no. 5054: 1166-1166. Nov. 16, 1957.
 DLC (R31.B93, no. 5054)

The possibility of manned lunar travel is discussed. Problems related to decreased gravity, lack of atmosphere, and meteor bombardment are briefly considered.

- 6717
 Oberth, H.
[MAN INTO SPACE: NEW PROJECTS FOR ROCKET AND SPACE TRAVEL] Translated from the German by G. P. H. De Freville.—232 p. New York: Harper & Brothers Publishers, 1957. DLC (TL790.0283)
 English translation of item no. 3263, Vol. III.

- 6718
 Ogle, D. C.
PEOPLE FOR SPACE VEHICLES: SPACE MEDICINE.—In: The age of space, p. 25-29. Birmingham, Ala.: Southern Research Inst., [1957?]
 Many areas must be fully studied before the selection and training of human candidates suitable to withstand the traumatic influence of prolonged space-living. These include the provision of air, water, food, and recreation within the sealed space vehicle as well as devising a means of waste elimination. Consideration must also be given to the protection of the astronauts from accelerative and decelerative forces; management of monotony and the break-off phenomenon, and protection from the hazards of magnetic storms, cosmic and ultraviolet radiations, temperature extremes, and meteorites.

- 6719
REALITIES OF SPACE TRAVEL: SELECTED PAPERS OF THE BRITISH INTERPLANETARY SOCIETY.—Ed. by L. J. Carter. 431 p. London: Putnam, 1957. DLC (TL790.A1B718)
 This volume contains 24 papers which are placed in the following categories: (1) introduction to astronautics, (2) the satellite vehicle, (3) interplanetary flight, (4) physical factors in space flight, (5) biological aspects of space flight, (6) targets for tomorrow, (7) the development of astronautics, (8) establishments and testing stations, (9) history of astronautics, and (10) the distant future. Also included are appendices, plates, and name and subject indexes. Pertinent papers are abstracted separately, see items no. 6709, 6757, 6786, 7241, 7634, 8128, 8250.

- 6720
 Savely, H. E.,
 and J. P. Henry
A NEW LOOK AT AVIATION PHYSIOLOGY.—Jour. Aviation Med., 28 (6): 531-534. Dec. 1957. DLC (RC1050.A36, v. 28)

A discussion is presented of the need of greater emphasis on the study of the nervous system in aviation physiology and for greater association with psychology. In the behavioral sciences, especially the applied science of human engineering, there should be a convergence of the fields of the social sciences, psychology, physiology, biochemistry, and biophysics. It appears essential that military research must extend and develop new psychological and physiological concepts for the use of humans in military operations.

- 6721
 Singh, A.
SOME PROBLEMS OF MILITARY AVIATION.—Aero Med. Soc. Jour. (New Delhi), 4 (1): 4-8. Dec. 1957. DNLM

The medical problems of explosive decompression, oxygen supply regulation, bailout and ejection, and temperature changes associated with high-speed, high-altitude military flight are briefly discussed. Consideration is also given to the fear of flying and aircrew care and selection.

- 6722
 Slater, A. E.
MEDICAL AND BIOLOGICAL PROBLEMS.—In: Space research and exploration, p. 165-181. Ed. by D. R. Bates et al. London: Eyre & Spottiswoode, 1957. DLC (TL790.B3)

Conditioning man to tolerate excessive accelerations and weightlessness during spaceflight is discussed. Consideration is given to the hazards of ultraviolet, X-ray, and cosmic ray radiations, and to the problems associated with respiration and food consumption on board the spaceship.

- 6723
 Stuhlinger, E.
OUTLOOK TO SPACE TRAVEL.—Scient. Monthly, 85 (6): 281-287. Dec. 1957. DLC (Q1.S817, v. 85)
 This is a discussion of interplanetary travel, especially to Mars. Consideration is given to phases of the voyage, construction requirements and electric propulsion systems for the spacecraft, the flight path, hazards of cosmic rays and meteors in space, the maintenance of an artificial atmosphere to support life, and the monotony of seclusion of the space crew within the ship's living quarters for two years.

- 6724
 Stuhlinger, E.
A TRIP TO MARS.—In: The age of space, p. 6-14. Birmingham, Ala.: Southern Research Inst., [1957?] DLC (TL787.96)
 In spite of the fact that relatively simple techniques are available by which a spaceship can be propelled, guided, and navigated through interplanetary space towards Mars, meteors and cosmic rays present a constant danger. Consideration is given to maintaining an artificial atmosphere for the space crew in the traveling vehicle, providing comfortable and adequate space suits, and handling the psychological impact of monotonous seclusion in the ship's living quarters for the travel time of two full years.

b. History

- 6725
 Campbell, P. A.
SPACE TRAVEL, A SYMPOSIUM: INTRODUCTION.—Jour. Aviation Med., 28 (5): 479-480. Oct. 1957. DLC (RC1050.A36, v. 28)

Data are presented to show man's conquest of altitude chronologically, by the percentage of the atmosphere penetrated, and by penetration according to the year of achievement. The most rapid progress is shown to have occurred in the early days of aviation.

6726

Cirone, M.

[ON THE THIRTIETH ANNIVERSARY OF THE AMUNDSEN-ELLSWORTH-MOBILE TRANSPOLAR FLIGHT: A PHYSICIAN'S VIEWPOINT] Ricorrendo il trentesimo anniversario del volo transpolare Amundsen-Ellsworth-Nobile: appunti di un medico. —Rivista di medicina aeronautica (Roma), 20 (1): 82-107. Jan.-March 1957. In Italian, with English summary (p. 104). DLC (RC1050.R56, v. 20)
Same as item no. 5321, Vol. V.

6727

Link, M. M.

LILJENCRANTZ AND BOYNTON: A STUDY IN HEROISM.—*Jour. Aviation Med.*, 38 (6): 569-575. Dec. 1957. DLC (RC1050.A36, v. 38)

A brief historical review is given of the lives and professional activities of the physicians Eric Liljencrantz and Melbourne W. Boynton. The account of their deaths while performing duties connected with aviation medicine is presented.

6728

Ross, M. D.

and M. L. Lewis

TO 76,000 FEET BY STRATO-LAB BALLOON.—*National Geogr. Mag.*, 111 (2): 269-282. Feb. 1957. DLC (G1.N27, v. 111)

A popular account is presented of the record-breaking Strato-Lab balloon flight to 76,000 feet on November 8, 1956. It includes descriptions of preparations before the flight, the balloon, launch, measurements taken during the flight, and the emergency which caused rapid, but not harmful, descent. The flight was made to obtain data relating to aeromedicine, meteorology, atmospheric physics, astronomy, and other fields. The article is well illustrated.

6729

Stapp, J. P.

THE FIRST SPACE MAN.—*Astronautics*, 2 (4): 30-31, 82-83. Nov. 1957. DLC (TL787.A8, v. 2)

A step-by-step report is presented of the 32-hour balloon flight of Major David G. Simons on August 19-20, 1957, from Crosby, Minnesota. Wearing an M3 pressure suit and sealed in a gondola with equipment to make continuous recordings of meteorological, physical, astronomical, geophysical, and human psychophysiological material, he attained an altitude of 100,000 feet.

6730

Winzen, O. C.

BRIDGEHEAD IN SPACE.—*Interavia* (Geneva), 12 (10): 1040-1041. Oct. 1957. DLC (TL500.I555, v. 12)

Data are presented of the second major scientific flight of the Man-High program of August 19-20, 1957. These data include descriptions of the qualifications of the balloon pilot, Major David Simons, of the balloon and its equipment (including a battery of instruments for observations in the field of aeromedicine, astronautics, and meteorology), and of the 30-hour flight. Although it will be months before all of the results of the flight are known, it is believed that this second Man-High flight was completely successful. But the most important aspect of the flight was the establishment of a bridgehead in space which, it is hoped, will be the forerunner of many more balloon-borne laboratory flights.

c. Reviews, Treatises, Handbooks, etc.

6731

Maycock, R.

DOCTORS IN THE AIR.—145 p. London: George Allen & Unwin Ltd., 1957. DLC (UG635.G7M38)

This book outlines the hazards of flight, such as the effects of anoxia and gravity, and the physiological aspects of flight training as a background to the work and adventure of the physicians in the British Air Force. The flight surgeon is concerned with curative and preventive medicine for the aircrew and with the problems of vision (especially at night), airsickness, oxygen supply, etc. Consideration is given to air rescue services and to aeromedical transportation of wounded and sick patients.

6732

Platonov, K.

[MAN IN FLIGHT] Chelovek v polete.—2nd ed. 284+ [2] p. Moskva: Voennoe Izdatel'stvo Ministerstva Oborony SSSR, 1957. In Russian. DLC (RC1075.P545, 1957)

A manual of aviation medicine, reviewing the basic problems of aviation medicine for use by fliers, aviation schools, and interested laymen. The chapters deal with the history of aviation; development of aviation medicine; problems created by cold, hypoxia, and lowered barometric pressure at high altitudes; altitude training; sealed cabins; high-altitude pressure suits; space flight; acceleration and deceleration forces; effects of vibration and noise in flight; special problems of flying at night and in adverse weather conditions; and hygienic requirements for pilots.

6733

Royal Canadian Air Force

THE ROYAL CANADIAN AIR FORCE MANUAL FOR MEDICAN OFFICERS (MEDICAL STANDARDS FOR AIRCREW AND GROUND CREW).—Vol. I, CAP 195. 98 p. Ottawa, July 1957.

DNLN (WD705.qc212m, v. 1)

This manual is a combination of the former CAP 195 volumes IX and X, revised for use in the examination and categorization of all Royal Canadian Air Force personnel as well as candidates for enrollment in the Air Force. The table of contents includes the following chapters: general; age, height, weight, chest measurements and body build; nervous system; cardiovascular system; respiratory system; eyes, ear, mouth, nose and throat; gastro-intestinal system; genito-urinary system; thyroid gland and lymphatics; surgical abnormalities, deformities, etc.; dermatology; tropical diseases; the 40 mm. Flack test; physical profile; minimum physical requirements; categorization and medical requirements; determination of aircrew potentiality; common causes of rejection; medical and physical requirements for women; and medical examination of direct entry officers and of airmen on appointment to commissioned rank or remuster.

6734

Ruff, S.

and H. Strughold

[PRINCIPLES OF AVIATION MEDICINE] Grundsätze der Luftfahrtmedizin.—3rd rev. ed. [vi]+263 p. München: J. A. Barth, 1957. In German. DLC (RC1062.R8, 1957)

This is a revised edition of the earlier work first

published in 1939. Various chapters have been brought up to date and new material has been included to keep in step with the aeronautical advances.

6735

THE SPACE ENCYCLOPEDIA: A GUIDE TO ASTRONOMY AND SPACE RESEARCH.—Ed. by M. T. Bisseny et al. 287 p. New York: E. P. Dutton & Co., 1957. DLC (TL788.86)

This is an illustrated encyclopedia, which deals with the entire field of astronautics, including space medicine, alphabetically arranged by principal subjects.

d. Miscellaneous Reference Materials

6736

Krieger, F. J.
A CASEBOOK ON SOVIET ASTRONAUTICS. II.—Rand Corp., Santa Monica, Calif. [Contract AF 33(038)6413]. Research memorandum no. 1922, June 21, 1957. viii+203 p. AD 133 016 UNCLASSIFIED

The format of the present report is similar to that of research memorandum-1760. There are two principal sections. The first is a two-part bibliography of Russian books (77) and periodicals (70) dealing with various aspects of rocketry and astronautics. The second is a series of complete translations from the Russian (except in a few cases) of articles and papers by various authorities, arranged in chronological order, the contents of which, although innocuous in the main, show the singleness of purpose in the Soviet space flight program. (From the editor's preface)

6737

Robinette, J. C.
A SELECTED BIBLIOGRAPHY CONCERNING PHYSIOLOGICAL FACTORS IN AEROMEDICAL RESEARCH AND DEVELOPMENT.—Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. April 1957. iv+42 p. AD 126 401 PB 139 290

This is a compilation of 342 reports and 6 handbooks dealing with the physiological factors as related to aeromedical research and development, prepared by the Aero Medical Laboratory, Directorate of Research, Wright Air Development Center. The principal topics include thermal physiology and protective garments; toxicity of materials and toxic chemical measurement; respiratory physiology and high-altitude protective garments; aircraft visual requirements; and nutrition and metabolism. Included is an index of memorandum reports, Air Force technical reports, technical memorandum reports, technical notes, and technical reports.

6738

Siegfried, M.
BIBLIOGRAPHY OF RESEARCH REPORTS ISSUED BY THE BIOPHYSICS BRANCH.—Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. Unnumbered Report, Jan. 1957. 14 p. AD 126 361 UNCLASSIFIED

This bibliography consists of those publications (including technical reports, technical notes, memorandum reports, and papers) which are considered to be of lasting interest in the fields of research being conducted in the Biophysics Branch of the Aero Medical Laboratory, Directorate of Research, Wright Air

Development Center. The material is divided by subject according to the type of work conducted and covers the areas of acceleration, anthropology, bioelectronics, escape, and stress and fatigue. Indexes (subject and author) of the 116 references are included.

e. Meetings and Symposia

6739

ABSTRACTS OF SCIENTIFIC PAPERS TO BE PRESENTED AT THE SECOND EUROPEAN CONGRESS OF AVIATION MEDICINE IN STOCKHOLM.—Meddelanden från flyg- och navalmedicinska nämnden (Stockholm), 1957 (Congress Number): 5-19. 1957. In English or French.

Abstracts are presented of reports dealing with acceleration, decompression, recompression, psycho-physiology, psychology, medical examination, and pilot selection, contributed by the following authors:

Aschan, G. K.	Kylstra, J.
Barr, P. O.	Langraf, F.
Beckh, H. J. von	Lansberg, M. P.
Berry, C. A.	Leeuwe, H.
Brurstedt, H.	Leverett, S. D., Jr.
Bondurant, S. O.	Lovelace II, W. R.
Bower, H. R.	Luft, U. C.
Burgeat, P.	Lundin, G.
Clarke, N. P.	Meehan, J. P.
Cohen, S. I.	Norsworthy, M. E.
Coleridge, J. C. G.	Perdriel, G.
Colin	Pletcher, K. E.
Conover, D. W.	Pinster, G. J.
Cunningham, C. E.	Robert, P.
Curville, J.	Ruffel Smith, H. P.
Diringshofen, H. von	Schubert, G.
Doesschate, G. ten	Secrest, R. R.
Döbeln, W. von	Sénelar, R.
Engström, C. G.	Silverman, A. J.
Flickinger, D.	Steinkamp, G. R.
Frankenhausen, M.	Stigter, H.
Gauer, O. H.	Strunza, M. V.
Gell, C. F.	Ström, G.
Grognot, P.	Vermot, M.
Henry, J. P.	Wealey, I.
Holmstrom, F. M. G.	White, C. S.
Howard, P.	White, W. J.
Höök, O.	Wulfften Palthe, P. M.
Jacobs, H. I.	van
Jethon, Z.	Yudofsky, P.
Jordi, A. U.	Zarriello, J. J.
Kolder, H.	Zuidema, G.

6740

THE AGE OF SPACE: PROCEEDINGS.—Sponsored by Southern Research Inst., Birmingham, Ala. 43 p. [1957?] DLC (TL787.86)

The proceedings are presented of a non-technical conference on missiles, rockets, and space travel, and their impact on present times, which was held on May 16, 1957. Pertinent articles are abstracted separately; see items no. 6718, 6724.

6741

THE FIRST EUROPEAN CONGRESS OF AVIATION MEDICINE.—Aeromedica acta (Soesterberg, Netherlands), Special edition, 1957. 237 p. DNLM

This volume contains twenty-three papers presented at the First European Congress of Aviation Medicine, held at Scheveningen (The Hague) on October 30 - November 1, 1956. The reports are abstracted separately; see items no. 7179, 7222, 7653, 7654, 7655, 7656, 7658, 7705, 7714, 7723, 7724, 7734, 7744, 7745, 7794, 7900, 7902, 7908, 7916, 8137.

6742

Georgievskii, A. S. 1957
and N. S. Molchanov
[THE FIFTH MILITARY SCIENTIFIC CONFERENCE OF J. E. PURKINJE MILITARY MEDICAL ACADEMY IN CZECHOSLOVAKIA] O platoi voenno-nauchnoi konferentsii Voenno-meditsinskoi akademii imeni Ia. E. Purkine v Czechoslovakii. --- Voenno-meditsinskii zhurnal (Moskva), 1957 (9): 91-94. Sept. 1957. In Russian. DLC (RC970.V55, v. 1957)

The fifth conference of the Purkinje Military Medical Academy was held in Hradec Kralove, Czechoslovakia, in April 1957. Among the topics discussed were the following: researches on the organization of military medicine; treatment of burns and wounds; surgical treatment of chronic otitis media; nutrition and hygiene in military personnel; optic rheobase and chronaxy; and cortical stimulation in hypoxia.

6743

Greenwood, S. W.
THE CRANFIELD SYMPOSIUM.—Spaceflight (London), 1 (5): 173-175. Oct. 1957.

DLC (TL787.B725, v. 1)

The proceedings are presented of the symposium on high-altitude and satellite rockets held on July 18-19, 1957, at the College of Aeronautics at Cranfield in Bedfordshire, England. Brief summaries are given of the following papers relating to aerospace medicine: The Scientific applications of rockets and satellites, by H. S. W. Massey; Re-entry and recovery, by W. F. Hilton; Some problems of instrumentation, telemetry and guidance, by A. W. Lines; Problems of respiratory metabolism in sealed cabins, by H. G. Clamman; Psycho-physiological hazards of satellite flight, by J. P. Henry; and Future developments in rocket propulsion beyond the atmosphere, by L. R. Shepherd.

6744

HUMAN FACTORS GROUP TO HOLD FIRST MEETING.—Aviation Week, 67 (11): 63. Sept. 16, 1957.
DLC (TL501.A8, v. 67)

The Human Factors Society of America will hold its first national meeting and constitutional convention in Tulsa, Okla., on Sept. 25, 1957. This meeting will be devoted primarily to reports of interim committees, formal organization, and other planning. The aims of the society are to increase and diffuse knowledge of man-machine environment factors in all its ramifications, pure and applied; to promote mutual interests of investigators of man-machine problems of supporting sciences, designers, manufacturers, and users of products and apparatus of all kinds related to man, and to encourage cooperation among these various agencies.

6745

Isakov, P. K.,
and A. G. Kuznetsov
[CONGRESS OF THE FLIGHT SURGEONS IN WARSAW] O s'ezde aviatsionnykh vrachei v Varshave.

--- Voenno-meditsinskii zhurnal (Moskva), 1957 (4): 56-59. April 1957. In Russian.

DLC (RC970.V55, v. 1957)

This is a report on the congress of flight surgeons, held in November, 1956, in Warsaw. Among the topics discussed were: (1) the conditions of the central nervous system in fliers; (2) environmental factors and their effects upon the organism in flight and in the laboratory; (3) the effect of bailout on the human organism; (4) survival kits; (5) the effect of acceleration forces on respiration, spatial mobility, and skeletal muscles; (6) alcoholism in fliers; (7) incidence of accidents with jet and propeller planes; and (8) the necessity for complete physical examination before actual flights. The congress resolved to publish a serial, "Aviation Medicine", and to increase the international cooperation in the field of aviation medicine.

6746

Stone, I.,
and R. Sweeney
ION, PHOTON POWER SPACE TRAVEL HOPE.—Aviation Week, 66 (9): 103-104, 108, 111, 113. March 4, 1957. DLC (TL501.A8, v. 66)

A report is presented on the three-day astronautics symposium in San Diego, California, sponsored jointly by Air Force Office of Scientific Research and Convair Division of General Dynamics Corp. Difficult space problems analyzed at the symposium include propulsion, re-entry, human factors, tracking and communications, environment and measurements, and orbits. Interest of 500 scientists and engineers from the military, industry, and universities indicated that the symposium probably will become an annual affair.

6747

Sweeney, R.
MEDICAL GROUP REPORTS ON PILOT FITNESS.—Aviation Week, 67 (20): 131, 135, 137. Nov. 18, 1957.
DLC (TL501.A8, v. 67)

Progress in understanding the human factors in high-altitude and high-speed flight was outlined at the Third Annual Aviation Medicine Symposium in Los Angeles, Calif. Reports were made on: (1) the Civil Aeronautics Administration plan to obtain more realistic physical fitness standards for civil pilots by gathering data under provisions of reworded Part 29 of Civil Air Regulations; (2) operational human factors problems with the F8U; (3) Project Man High, biodynamics, weightlessness; and (4) the Army-Navy instrumentation program. Also given were reports on medical aspects of Litton's high-vacuum laboratory; Convair's thermal stress, radiation, and dynamic vertebral column loading programs; and work on sound by the research center of the Subcommittee on Noise in Industry.

6748

SYMPOSIUM: PHYSICAL STANDARDS & SELECTION (AVIATION MEDICINE RESIDENCY PROGRAM).—Air University. School of Aviation Medicine, Randolph Air Force Base, Tex. [Unnumbered report, 1957]. 158 p. AD 144 144 UNCLASSIFIED

This is a collection of papers by various authors, presented at a symposium on physical standards for personnel, February 19-20, 1957. Pertinent individual papers are abstracted separately, see items no. 7179, 7222, 7653, 7654, 7655, 7656, 7658, 7705, 7714,

7723, 7724, 7734, 7744, 7745, 7794, 7900, 7902, 7908, 7916, 8137.

6749

Thompson, G. V. E.

PROGRESS TOWARDS SPACEFLIGHT.—Spaceflight (London), 1 (2): 77-82. Jan. 1957.

DLC (TL787.B725, v. 1)

A review is presented of the technical papers given at the Seventh Astronautical Congress in Rome, Sept. 15-22, 1956. These papers relate to the following: (1) various types of artificial satellites; (2) space medicine; (3) methods of propulsion; (4) rocket design and journeys; and (5) miscellaneous matters, including legal aspects of space travel, optimal measurements of the ultra-violet part of the spectrum, time estimates before man's first flights to the planets, an astronautical Moon and planets calendar, and conformation representation of twofold-dependent regions.

f. Organizational and Administrative Aspects

6750

Brody, S. I.

ESTABLISHMENT OF THE JOINT COMMITTEE ON AVIATION PATHOLOGY.—Jour. Aviation Med., 28 (1): 23-26. Feb. 1957. DLC (RC1050.A36, v. 28)

This organization is composed of representatives of the Armed Forces Institute of Pathology, the United States Army, Navy, and Air Force, the (British) Royal Navy and Air Force, the Royal Canadian Air Force, and various interested civilian agencies. It was formed in November 1955 as a result of recognition of the role pathology might play in aviation medicine. The Committee is to act as an organizer and disseminator of information on aviation pathology and an investigator of those psychologic and physiologic factors associated with flight stresses which may produce irreversible tissue changes or lead to aircraft accidents.

6751

Carmichael, J. C.

ENVIRONMENTAL HEALTH LABORATORY PROGRAM.—Far East Air Forces Command Surgeon's Newsletter, 3 (2): 24-27. Feb.-March 1957. DNLM

The environmental health laboratory support was developed in direct proportion to the needs of the air force occupational health program. Laboratories are organized into sections by functional areas, namely: biochemical analysis, materials analysis, sanitary engineering, atmospheric analysis, microbiological and toxicological analysis, and measurements.

6752

Gell, C. F.

THE AIR CREW EQUIPMENT LABORATORY.—Contact (Pensacola), 15 (1): 26-28. 1957. DNLM

The Air Crew Equipment Laboratory of the Naval Air Materiel Center deals specifically with the bio-engineering aspects of aviation problems, covering the entire field with the exception of radial acceleration. Research is carried out by the escape and crash equipment program, full pressure suit for high altitude program, aviation flight and protective clothing branch, and human engineering branch.

6753

USAF BUILDS MEDICAL SCHOOL UNITS.—Aviation Week, 66 (18): 65. May 6, 1957.

DLC (TL501.A8, v. 66)

Descriptions are presented of a new \$9 million installation for the Air Force School of Aviation Medicine at Brooks Air Force Base, Texas. Now under construction are the Research Institute, Academic Building (to house the school's headquarters, aeromedical library, experimental laboratories), Flight Medicine Laboratory (future Air Force repository for pilot and air crew physical examination records and development and evaluation facility for flying fitness tests), and shops and cooling and heating plants. The Altitude Laboratory, to be added later, is also described.

6754

Zinneman

[THE ROLE OF AGARD IN THE DEFENSE COMMUNITY OF NATO] Le rôle de l'AGARD dans la communauté de défense de l'OTAN.—Force aérienne, Service de santé, Bulletin technique d'information [Bruxelles], 1957 (Dec.): 19-25. In French. DNLM

The organization and scope of the Advisory Group for Aeronautical Research and Development (AGARD) of the North Atlantic Treaty Organization (NATO) is briefly reviewed. Consideration is given to the aeromedical committee, its history, programs, conferences, and publications. Activity of its work groups centers primarily around the problems of vision, cardiovascular and respiratory function, and bio-anthropometry.

g. Research and Research Methods

6755

Achiary, A.,

and A. Cabanon

[THE MEDICO-PHYSIOLOGICAL LABORATORY OF THE FLIGHT TEST CENTER OF BRÉTIGNY] Le laboratoire médico-physiologique du Centre d'Essais en Vol de Brétigny.—Médecine aéronautique (Paris), 12 (4): 371-378. 1957. In French.

DLC (TL555.M394, v. 12)

The mission of the medico-physiological laboratory of the Brétigny Flight Test Center is to study the human factor in aviation. The Center houses a large atmospheric decompression chamber and a centrifuge, around which are located laboratories of physiology, biochemistry, telemetry, hematology, medical examination, etc. A general description, with illustrations, is presented of the decompression chamber and centrifuge.

6756

Bjurstedt, H.

[AEROMEDICAL RESEARCH IN SWEDEN]—Meddelanden från flyg- och navalmedicinska nämnden (Stockholm), 1957 (Congress Number): 1-4. 1957. In English. DNLM

The establishment and functions of the State Research Committee on Aviation Medicine are described, classed in three major categories: (1) research in factors detrimental to functions of the organisms during flight, (2) study of the physiology of such disturbances, and (3) the development and recommendation of protective measures or equip-

ment. Active research is carried out at three physiology laboratories, the Karolinska Institute Faculty of Medicine, the Institute of Physical Education at Stockholm, and the University of Lund. Each of the laboratories is equipped with low-pressure chambers. The Karolinska Institute also has a human centrifuge. Both basic and applied aeromedical research is carried out. The Committee appoints special or indefinite subcommittees to investigate complex problems requiring cooperation of several scientific disciplines. Investigators of the Committee act as consultants with regard to safety equipment, cockpit layout, revision of safety regulations, and air accident investigation. Other activities include aeromedical instruction and indoctrination courses, and publishing of this journal.

6757

Cleaver, A. V.

A PROGRAMME FOR ACHIEVING INTERPLANETARY FLIGHT.—In: Realities of space travel, p. 335-368. Ed. by L. J. Carter. London: Putnam, 1957. DLC (TL790.A1B718)

[This is a reprint of an article which appeared in: Jour. Brit. Interplanetary Soc., 13 (1): 1-27. Jan. 1954].

The program of national interplanetary societies leading to interplanetary flight consists of three stages: (1) the establishment of an instrument-carrying, unmanned, satellite rocket vehicle; (2) achieving regular manned orbital flights around the Earth, with occasional expeditions (manned or otherwise) to circumnavigate the Moon at least, and (3) achievement of interplanetary flight, with landings on the Moon, and subsequently on Mars, Venus, and the other planets within the Solar System.

6758

Masamitsu, O.

[SPACE MEDICINE IN THE UNITED STATES OF AMERICA].—Japanese Safety Forces Med. Jour. (Tokyo), 4 (2): 12-63. Feb. 1957. In Japanese.

DNLM

This is a review of space medicine research in the United States concerned with sealed cabins, the biological effects of weightlessness and subgravity (space sickness, disorientation, neuromuscular discoordination, ocular illusory phenomena), linear accelerations and decelerations, protection against meteorites, cosmic and ultraviolet radiations, space vision, physical and physiological day-night cycles, and the effects of solar radiations.

6759

RESEARCH AT THE AERO MEDICAL LABORATORY.—U. S. Air Force Medical Service Digest, 8 (7): 1-22. July 1957. DNLM

The problems involved in maintaining a balance between the physio-pathological capabilities of the airman and the increasing stresses imposed upon him by flight at high altitude in long range, supersonic aircraft, form a basis for the complex and diverse mission of the Air Force Aero Medical Laboratory. Continually investigated problems are: emergency escape from aircraft, including factors of tumbling, windblast, parachute opening shock; acceleration and deceleration of high-speed aircraft; positive and negative g tolerance; effect of pressurization and loss of pressurization in simulated and operational flights; integration of personal equipment and anthropometry; human error and performance abilities in operating controls, including principles of

training, control design and arrangement, and mental and emotional adjustment problems; effects of noise exposure and its control and reduction; all-climatic survival on land and sea; toxicity hazards from various materials in aircraft; and all phases of high-altitude physiology.

6760

Rosen, M. W.

DOWN-TO-EARTH VIEW OF SPACE FLIGHT.—Office of Naval Research, Research Rev., 1957 (Feb.): 8-13. DLC (Q180.U5A354, 1957)

Thus far, research contributing to space travel has been accomplished as a byproduct of other projects, largely military. It is now necessary for someone or some group to assess clearly the problems involved in space flight and to determine what is being done and what can be done to make further progress. Such a group should consist of able and respected representatives of government, science, and industry and might be sponsored by the National Science Foundation. Recommendations are listed covering the procedure the proposed space-flight committee could follow. The advantages to be obtained from space flight exploration are discussed.

6761

SPACE RESEARCH AND EXPLORATION.—Ed. by

D. R. Bates et al. 224 p. London: Eyre & Spottiswoode, 1957. DLC (TL790.B3)

In this book a group of writers seeks to provide information on the main aspects of space exploration, placing emphasis on general scientific principles rather than on technical details. Included are an index, appendix, and multiple illustrations. Pertinent articles are abstracted separately, see items no.

6762

Sweeney, R.

STUDIES PROBE MAN'S FUNCTION IN SPACE.—Aviation Week, 67 (26): 45-47, 49. Dec. 30, 1957. DLC (TL501.A8, v. 67)

Research activities are described on problems of man's existence and function during space flight as carried out by three Southern California contractors: North American Aviation, Convair, and the Douglas Aircraft Company. These studies, taking place before manned space flight is attempted, range from proposals (as in the case for North American) to a service for specific investigations to company-underwritten general thinking efforts. Convair projects described include investigations of (1) human tolerance to complex and transverse accelerations; (2) human tolerance to combined environmental stresses in today's high-performance aircraft; (3) criteria concerning selection and training of bio-satellite crews; (4) calculations on a manned nuclear-propelled space vehicle; and (5) human factors in design of minimum capability required for a manned orbital vehicle. Douglas Aircraft Co. work has been categorized into three phases: supersonic at altitudes up to 100,000 ft.; hypersonic, over Mach 5, flight at altitudes up to one million feet; and pure space flight.

6763

Vries, E. de

[THE FLIGHT TRAINING CENTER OF THE ROYAL AIR FORCE] Het Vlieger Training Centrum van de Koninklijke Luchtmacht.—Nederlands militair

geneeskundig tijdschrift ('s-Gravenhage), 10 (12):
377-389. Dec. 1957. In Dutch.

DLC (RC971.N4, v. 10)

The post-graduate flight training course of the
Dutch Air Force and the reasons for developing such
a course are described briefly. This course empha-

sizes flight safety procedures, acquaintance with
different types of safety equipment in American and
English aircraft, and the anatomical and physiologi-
cal background of aviation medicine. New develop-
ments in aviation and space safety equipment are
also introduced at this time.

2. BIOLOGY

a. General

6764

Kethley, T. W.,

E. L. Fincher, and W. B. Cown

THE EFFECT OF LOW TEMPERATURES ON THE SURVIVAL OF AIRBORNE BACTERIA.—Georgia Inst. of Technology. Engineering Experiment Station, Atlanta; issued by Arctic Aeromedical Lab., Ladd Air Force Base, Alaska. Project no. 8-7958, March 1957. 62 p. UNCLASSIFIED

Employing airborne bacterial particles dispersed from beef broth cultures, extensive studies are reported for *Serratia marcescens* (ATCC 274, primary form), and *Escherichia coli* (ATCC 10536) for the range of temperatures 80°F to -40°F. Preliminary studies are reported for *Serratia indica* (ATCC 4003), *Micrococcus pyogenes* var. *aureus* (ATCC 6538) and *Micrococcus pyogenes* var. *albus* (ATCC 9491). The very low death rate observed for the experimental bacterial aerosols at low temperatures is consistent with previous reports of the presence of viable bacteria in the upper atmosphere. Although the death rate of airborne bacteria is very small at low temperatures, the factors which determine the fate of these organisms are similar to those operating at higher temperatures. In general, it is suggested that the composition of the non-living material associated with the airborne bacterial particle is the most important single factor in determining the fate of such organisms. (From the authors' summary)

b. Closed Ecological Systems

[Applied aspects under 11-h]

6765

Edwards, G. P.

THE CULTURE OF ALGAE.—New York Univ. Coll. of Engineering, N. Y. (Contract AF 18(603)-71); issued by Air Force Office of Scientific Research [Washington, D. C.]. AFOSR Report no. 57-378, June 1957. 39 p. AD 132 452 PB 134 644

A review is presented of the literature dealing with the mechanics of photosynthesis, nutritional requirements for the growth of algae, mass culture systems, harvesting of algae, contamination of cultures, sewage treatment, types of algae used, inhibiting excretions during growth, the use of algae for food, photosynthetic gas exchange for the respiratory requirements of humans in a sealed cabin, and the desirable characteristics of algae. (PB abstract, modified) (49 references)

6766

Tamiya, H.

MASS CULTURE OF ALGAE.—Ann. Rev. Plant Physiol., 8: 309-334. 1957. DLC (Qk1 A48. v. 8)

Recent advances in the study of algal mass culture are reviewed. The following are included: (1) cultures under controlled laboratory conditions, (2) outdoor mass culture of green algae, (3) mass culturing of nitrogen-fixing algae, (4) algal culture in sewage, and (5) utilization of algal cells and economic appraisal. The author hopes that this review will show that the study of algal mass culture is now on a sound and right track, and that the arguments of its opponents are unfounded. (158 references)

c. Biological Rhythms and Space Time Studies

6767

Aschoff, J.

[ACTIVITY PATTERNS OF DIURNAL PERIODICITY] Aktivitätsmuster der Tagesperiodik.—Naturwissenschaften (Berlin), 44 (13): 361-367. July 1957. In German. DLC (Q3.N7, v. 44)

The diurnal activity rhythm in animals is discussed with respect to its periodicity. It is subject to a series of periodic processes of varying frequency. Most of the 24-hour activity patterns in nature are characterized by two maxima, i.e., the smaller maximum follows the chief maximum within less than 12 hours. The submaximum is more labile, more easily affected by weather influences, and less dependent on timers. In addition to rhythms with two peaks, other patterns of activity rhythms with 1 or 3 maxima have been isolated.

6768

Blume, J.

[THE INFLUENCE OF RHYTHMIC ALTERATIONS OF THE SLEEP-WAKEFULNESS CYCLE ON THE BASAL RHYTHM OF BODY TEMPERATURE] Über die Beeinflussung des Grundrhythmus der Körpertemperatur durch rhythmische Änderungen der Wach- und Schlafzeiten.—Zeitschrift für die gesamte experimentelle Medizin (Berlin), 128 (5): 452-457. 1957. In German. DNLN

The temperature data cited by Kleitman in "Sleep and Wakefulness" (two subjects were adapted successively to a week of a 21-hour diurnal cycle, a 24-hour diurnal cycle, and a 28-hour diurnal cycle) were subjected to a mathematical analysis of periodicities. It is shown that, contrary to Kleitman's conclusion, the basal temperature of both subjects adapted to the experimental diurnal cycle. However, in both cases the temperature rhythm of the last week was superimposed on the 21- and 24-hour rhythms of the two previous weeks.

6769

Donhoff, S.,

G. Szegvári, I. Varga-Nagy, and I. Járαι

[ON THE PERIODICITY OF THE CHEMICAL THERMOREGULATION IN THE RAT] Über die Periodizität der chemischen Wärmeregulation der Ratte.—Pflügers Archiv für die gesamte Physiologie (Berlin), 265 (2): 97-103. 1957. In German. DLC (QP1.A63, v. 265)

At ambient temperatures below the indifferent zone, the chemical thermoregulation in rat shows a pronounced, more or less regular periodicity. The cyclic increase in O₂ consumption is usually, but not always, associated with visible motor activity. Similar or more pronounced oscillations in heat production can be observed after injection of 0.06-0.08 g. urethan per 100 g. body weight without any visible muscle activity. Analysis of the data showed the onset and cessation of heightened heat production to be quite abrupt. (Authors' summary, translation)

6770

Halberg, F.,

J. J. Bittner, and D. Smith

[CHANGES IN ILLUMINATION AND THE 24-HOUR

PERIODICITY OF MITOSES IN THE SKIN EPITHELIUM OF MICE] Belichtungswechsel und 24-Stundenperiodik von Mitosen im Hautepithel der Maus.—*Zeitschrift für Vitamin- Hormon- und Fermentforschung* (Wien & Innsbruck), 9 (1/2): 69-73. 1957. In German, with English summary (p. 73). DNLM

The temporal placement within the 24-hour period of the mitotic rhythm in the pinna epidermis was studied in male mice of the D_g stock (dilute brown, subline 8). Following the abrupt inversion of the environmental lighting schedule, the timing of this rhythm was gradually but not abruptly shifted by 180°.

6771

Lampietro, P. F.,

E. R. Buskirk, D. E. Bass, and B. E. Welch
EFFECT OF FOOD, CLIMATE AND EXERCISE ON RECTAL TEMPERATURE DURING THE DAY.—*Jour. Applied Physiol.*, 11 (3):349-352. Nov. 1957. DLC (QP1.J2, v11)

Sixteen men were observed under different climatic, nutritional, and working conditions. Rectal temperatures showed the well known rise during the day, but there appeared to be no difference due to climate affecting the diurnal rhythm. With adequate food intake activity did not alter the rhythm, but in fasting with no activity the rise in temperature was reduced by one-half. During fasting and with exercise rectal temperature was the same at 8 a.m. and 8 p.m. It is suggested that the change in diurnal rhythm is due mostly to the ingestion of food.

6772

Lewis, H. E.,

and J. P. Masterton

SLEEP AND WAKEFULNESS IN THE ARCTIC.—*Lancet* (London), 272 (6982): 1262-1266. June 22, 1957. DLC (R31.L3, v. 272)

Members of the British North Greenland Expedition were observed for patterns of sleep and wakefulness during their stay in the Arctic. More of the 24 clock hours were used for sleep during the midwinter (continuous darkness) and midsummer (continuous light). No great differences were observed during months of indoor confinement or months when outdoor activity was possible. Numerous naps were the preferred type of sleep during the winter. Though the men slept undisturbed, the mean total duration of sleep for any 24 hour "day" was 7 to 9 hours.

6773

Lewis, P. R.,

and M. C. Lobban

DISSOCIATION OF DIURNAL RHYTHMS IN HUMAN SUBJECTS LIVING ON ABNORMAL TIME ROUTINES.—*Quart. Jour. Exper. Physiol.* (London), 42 (4): 371-386. Oct. 1957. DNLM

Twelve subjects lived as two isolated communities in Spitsbergen, one group living on a 21-hour routine and the other on a 27-hour routine. Recordings were made of body temperature and of the excretion of water, chloride, and potassium. The temperature rhythm adapted almost immediately to the abnormal routines in 11 out of 12 subjects, in marked contrast to the excretory rhythms, which adapted immediately in only 3 subjects. Fourier analysis of the data obtained confirmed that, when living on a normal 24-hour routine, the excretory rhythms for water, chloride, and potassium are extremely similar, both in amplitude and timing. On the abnormal routines, however,

small but statistically significant differences between the three rhythms were very common and marked dissociations were not uncommon. The usual type of marked dissociation observed was that in which the rhythm of potassium excretion was out of phase with those of water and chloride, with the potassium showing more evidence of the persistence of an inherent 24-hour component. An attempt was made to classify various diurnal rhythms according to their tendency to adapt to an abnormal time routine. It is suggested that there must be more than one mechanism controlling physiological diurnal rhythms in man. One such mechanism is almost certainly central. (From the author's summary)

6774

Lewis, P. R.,

and M. C. Lobban

THE EFFECTS OF PROLONGED PERIODS OF LIFE AND ABNORMAL TIME ROUTINES UPON EXCRETORY RHYTHMS IN HUMAN SUBJECTS.—*Quart. Jour. Exper. Physiol.* (London), 42 (4): 356-371. Oct. 1957. DNLM

Measurements were made of water, potassium, and chloride excretion in subjects living on both 21-hour and 27-hour routines, the experimental cycle being one of eight days. For 21-hour time eight experimental days were equivalent to seven real days, while for 27-hour time, they were equivalent to nine real days. Data are presented both in the form of histograms and as diagrams and tables which were constructed from the results of a full mathematical analysis of the experimental values obtained. Initial adaptation of the excretory rhythms to the abnormal time routines was relatively uncommon, being shown by one subject only on the 21-hour routine and by two subjects on the 27-hour routine. Progressive improvement in adaptation of excretory rhythms to the abnormal time routines during the course of the experiment was more common than previously thought, but the degree of adaptation attained was seldom complete, even after a full six weeks on the environmental routine. (From the authors' summary)

6775

Müller, M.,

and H. Giersberg

[ON THE EFFECT OF INTERNAL SECRETIONS ON THE DIURNAL ACTIVITY OF THE WHITE MOUSE] Über den Einfluss der inneren Sekretion auf die tagesperiodische Aktivität der weissen Maus.—*Zeitschrift für vergleichende Physiologie* (Berlin), 40 (5): 454-472. 1957. In German. DNLM

In the normal white mouse the activity maxima differ under conditions of the diurnal cycle: continuous darkness, and continuous illumination. The periods are shorter in darkness, and longer in light than in the normal diurnal cycle. Subcutaneous and intravenous injection of melanophorin did not affect the activity cycles and diurnal periodicity in the normal or the hypophysectomized mouse. Removal of the hypophysis did not affect the maintenance of periodicity in dark and in light. Melanophorin did not affect the metabolism or the respiratory rhythm in the hypophysectomized animal. (From the authors' summary)

6776

Reinberg, A.,

and J. Ghata

[BIOLOGICAL RHYTHMS AND CYCLES] Rythmes et

cycles biologiques.—128 p. Paris: Presses Universitaires de France, 1957. In French.
DLC (QP84.R37, 1957)

Various types and features of biological rhythms and cycles are reviewed to show their universality and complexity and to demonstrate their importance in animals and man. The review covers elementary rhythmic activities of living matter (respiratory and cardiac rhythms, pulsating vacuoles of Protozoa, rhythmicity of the neuromotor apparatus, attempts of general interpretation, physical models, extrinsic and intrinsic rhythms); nyctohemeral rhythms in plants and animals; multi-nyctohemeral lunar or monthly rhythms and cycles (including sexual cycles and rhythms of insects and mammals), annual rhythms (including hibernation of mammals, seasonal migrations). Nyctohemeral rhythms of man include the sleep-wake rhythm, rhythms of temperature, blood pressure, pulse, basal metabolism, endocrine activity, and variations of the functioning of renal and urinary excretions.

6777

Rowland, E. N.

A NOTE ON SPACE TRAVEL IN A GRAVITATIONAL FIELD.—*Jour. Brit. Interplanetary Soc.* (London), 16 (4): 216-221. Oct.-Dec. 1957.

DLC (TL790.A1B7, v. 16)

The behavior of clocks during travel in the curved space-time of the general theory of relativity is discussed. The effects observable in a journey in the Solar system or on Earth satellites are also examined. (Author's summary, modified)

6778

Vasil'ev, I. G.

1957

L. P. Zimnitskaya, E. L. Skliarchik, K. M. Smirnov, B. G. Filippov, S. A. Khitun, and A. M. Shatalov

[ON THE DIURNAL RHYTHM OF HUMAN WORK CAPACITY] O autochnom ritme rabotosposobnosti cheloveka. — *fiziologicheskii zhurnal SSSR* (Moskva), 43 (9): 817-824. Sept. 1957. In Russian, with English summary (p. 823-824).

As shown by a number of tests, daily variations of general fitness in healthy men conform to the 24-hour periodicity of physiological functions. Under unusual living conditions, however, the rhythm of these variations is upset more readily than the periodicity of vegetative functions. Different forms of activity are not equally dependent on the 24-hour periodicity of functional activity. Performance of stereotyped movements does not vary as much as that of movements of a greater complexity. Highly complex tasks, however, which are performed with some difficulty may also upset the daily rhythmicity of efficiency. Differentiation of motor responses to various stimuli is achieved more successfully in the day-time. Motor reactions of the hand are subject to the delaying influence exerted by work of the contralateral hand to a greater extent by night. Training has been found to be less effective after extremely early morning sessions than when carried on in the day-time. On the other hand, by means of training at unusual hours, some transformation of the daily rhythmicity of efficiency may be achieved. (Authors' summary)

f. Extraterrestrial Environments and Life Forms

6779

Faust, H.

[SPACE FLIGHT IN A COSMIC PERSPECTIVE]

Weltraumflug in kosmischer Sicht.—*Naturwissenschaftliche Rundschau* (Stuttgart), 10 (12): 445-448. Dec. 1957. In German. DLC (Q3.N823, v. 10)

The author discusses the development of forms of life on other planets as far as it is possible from an earth-bound viewpoint. The statistical probability of this having happened is extremely high. Particular consideration is given to the highly advantageous path of the Earth, its rotation, and its ecliptical inclination for the appearance of life on Earth.

6780

Goody, R. M.

THE ATMOSPHERE OF MARS.—*Jour. Brit. Interplanetary Soc.* (London), 16 (2): 69-83. April-June 1957. DLC (TL790.A1B7, v. 16)

A detailed discussion, with photographs and figures, is presented of the Martian atmosphere, dealing with topography, clouds and violet layer, temperature and winds, composition, the vertical structure of the atmosphere, and interpretation of cloud forms and movements. The Martian year is less than twice the Earth's, but the seasonal cycle of insolation is thought to be similar on the two planets. The length of the Martian day is 24 hours, 37 minutes.

6781

Haber, H.

SPACE TRAVEL, A SYMPOSIUM: THE ASTROPHYSICIST'S VIEWS.—*Jour. Aviation Med.*, 28 (5): 487-492. Oct. 1957. DLC (RC1050.A36, v. 28)

The most important contribution of astrophysics to space travel will be an analysis of the field of radiation that exists near the Earth, and how this field is related to the surface temperature of a body exposed to the radiation. A discussion is directed toward protecting the exposed body and any material within it from excessive heat. The radiation equilibrium for various materials is discussed, and the surface coatings of the Vanguard rocket are described. The theoretical aspects of radiation treatment should be tested, and an apparatus simulating space thermal conditions should be made available with the factors of a vacuum, solar radiation, radiation of the sunlit Earth, radiation of the dark Earth, and radiation characteristics of free space. Physical aspects of this apparatus are described.

6782

Hagen, J. P.

SPACE TRAVEL, A SYMPOSIUM: THE VANGUARD PROJECT.—*Jour. Aviation Med.*, 28 (5): 503-507. Oct. 1957. DLC (RC1050.A36, v. 28)

A description of the Vanguard launching vehicle is given as to its size, weight, engine thrust, motor mounting and guidance system. The trajectory and planned orbit for the missile are discussed. Early experiments to be carried out to measure environmental conditions within the satellite itself are described, as well as the first proposed attempts to measure solar radiation in space.

6783

Koolstra, J. A.,
and J. D. Fulton

A STUDY OF THE MICROORGANISMS OF THE UPPER ATMOSPHERE: INSTRUMENTATION FOR THE IN-FLIGHT DETECTION OF AIR-BORNE FLUORESCIN-IMPREGNATED PARTICLES.—School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 57-2, May 1957. 15 p.

UNCLASSIFIED

A fluorescein particle detector for the in-flight detection of fluorescein-impregnated tracer particles is described and diagramed. Individual particles were readily detected in the laboratory with the use of an artificial atmosphere. It was also used to detect tracer particles in an aerosol cloud when installed in an ETB-25 type aircraft. Detection was instantaneous with collection.

6784

Koslova, K. I.

[INTERPRETATION OF THE OBSERVATIONS OF MARS AFTER THE DRAWINGS MADE BY G. A. TIKHOV IN 1918, 1920, AND 1948] Obrabotka nabludenii Marsa po risunkam, poluchennym G. A. Tikhovym v 1918, 1920 i 1948 godakh. — Akademiia nauk kazakhskoi SSR (Alma-Ata), Trudy sektora astrobotaniki, 5: 83-94, 3 unpaginated plates. 1957. In Russian. DLC (QK1.A35866, v. 5)

From G. A. Tikhov's drawings of Mars, made during its opposition in 1918, 1920, and 1948 on the basis of visual and spectrographic observations, the following may be concluded: (1) the appearance of clouds, solid sediments and mist on Mars is a relatively common phenomenon; (2) a white zone along the northern coast of southern seas was observed; (3) the transparency of the atmosphere varied greatly, and dark spots were often visible on the surface of the planet; (4) from the 1920 observation it was evident that the seas were of different colors, brown in the northern hemisphere and green in the southern hemisphere; (5) in the 1948 observation, the seas were gray toward the center of the disc, acquiring a greenish hue toward the edge; and (6) in the 1948 observation, a dark border was very distinct around the northern polar cap, and was, on some days, the darkest spot on Mars.

6785

Kulper, G. P.

THE ATMOSPHERE AND THE CLOUD LAYER OF VENUS.—In: The threshold of space, p. 78-86. Ed. by M. Zeilikoff. New York: Pergamon Press.

DLC (QC879.U57)

The only gas definitely identified on Venus is carbon dioxide. A report of the presence of nitrogen in the spectrum of the dark side of the planet merits further exploration. It appears that the mean surface temperature of the planet is in excess of 320°K, i.e., more than 35°C. higher than on the Earth. Venus has no open basins of water, and the atmospheric content of the water vapor is, therefore, very low. Consideration is given to a possible interpretation of the Venus cloud cover, and various spectral, photometric, radiometric, and polarization studies of the planet appearing in the literature are reviewed.

6786

Moore, P.

CONDITIONS ON THE MOON AND NEARER

PLANETS.—In: Space research and exploration, p. 182-194. Ed. by D. R. Bates et al. London: Eyre & Spottiswoode, 1957. DLC (TL790.B3)

The atmospheric conditions of the Moon, Venus, Mars, Mercury, and the outer planets (Jupiter, Saturn, Uranus, Neptune, Pluto) are described and tabulated. Landings on planets are not considered other than for the three nearest bodies, the Moon, Mars, and Venus. The Moon is first because of its proximity, but of the three worlds Mars appears to have the least hostile environment.

6787

Moore, P.

THE PLANET MARS.—In: Realities of Space Travel, p. 313-334. Ed. by L. J. Carter. London: Putnam, 1957. DLC (TL790.A1B718)

[This is a reprint of an article which appeared in: Jour. Brit. Interplanetary Soc. (London), 14 (2): 65-84. March-April 1955.] A review is presented of the main features of Mars: its polar caps, canals, dark areas, ochre dust deserts, tracts of vegetation, clouds, meteors, auroras, and icy polar snows circled by two dwarf moons. The martian atmosphere, although oxygen-deficient, contains carbon dioxide, argon, and nitrogen. Atmospheric density and pressure are lower than that found on Earth.

6788

Poloskov, S. M.,
and B. A. Mirtov

THE STUDY OF THE UPPER ATMOSPHERE BY MEANS OF ROCKETS, AT THE ACADEMY OF SCIENCES, U.S.S.R.—Jour. Brit. Interplanetary Soc. (London), 16 (2): 95-100. April-June 1957.

DLC (TL790.A1B7, v. 16)

Study of the upper atmosphere by means of measuring instruments carried in automatically jettisoned containers fired from mortars is briefly discussed. Experiments deal primarily with determination of the atmospheric composition at altitudes of 80-95 kilometers, pressure at altitudes of 50-110 km., and speed and direction of winds at altitudes of 60-80 km. Further studies are considered on the role of the sun's ultraviolet and corpuscular radiation within the upper atmosphere.

6789

Richardson, R. S.

PRELIMINARY REPORT ON OBSERVATIONS OF MARS MADE AT MOUNT WILSON IN 1956.—Space-flight (London), 1 (3): 114. April 1957.

DLC (TL787.B725, v. 1)

Data are presented resulting from observations of Mars at Mount Wilson from May 5, to Dec. 16, 1956. These data relate to various features of the Martian surface and atmosphere including the canals, color of the dark regions (Maria), carbon dioxide, water vapor, and oxygen in the atmosphere.

6790

Strughold, H.

SPACE TRAVEL, A SYMPOSIUM: THE POSSIBILITIES OF AN INHABITABLE EXTRATERRESTRIAL ENVIRONMENT REACHABLE FROM THE EARTH.—Jour. Aviation Med., 28 (5): 507-512. Oct. 1957.

DLC (1050.A36, v. 28)

When considering life based on carbon and oxygen, Venus and Mars are thought to be the only planets with the possibility of supporting life similar to that on Earth. Ecological factors indispensable for life

such as water, oxygen, carbon dioxide, temperature, and light are considered. A discussion is given of the atmospheric conditions on Mars and the protection that a man will need when landing there. The surface air pressure on Mars will be equivalent to an altitude of 55,000 feet in our atmosphere, and pressure suits or pressure breathing will be necessary. Sub-zero temperatures at night will necessitate adequate heating apparatus. Cosmic rays and light intensity will not pose great hazards. Various requirements for indigenous life point out that organisms if present will probably take the form of cold-hardy vegetation. The total environment on Mars is likened to a combination of the microclimate of Tibet or the Pamir plateau and the macroclimate of the stratosphere of the Earth.

6791

Sulov, A. K.

[A PHILOSOPHICAL BASIS FOR THE POSSIBILITY OF EXTRATERRESTRIAL LIFE] O filosofskom obosnovani problema zhizni vne zemli. — Akademiia nauk kazakhskoi SSR (Alma-Ata), Trudy sektora astrobotaniki, 5: 207-211. 1957. In Russian. DLC (QK1.A35866, v. 5)

Materialistic and idealistic points of view on the problem of life on Mars are discussed. The theories of Weissman, Morgan, and Mendel are rejected, and only the theory explaining the origin of the solar system in terms of evolution of the planets and of life on them is considered acceptable. While some theorists claim that there is no clear evidence of a martian biosphere, the author does not agree with them. On the basis of astrobiological studies and spectrophotometric observations of Mars it is to be concluded that vegetal life forms on that planet are possible.

6792

Suvorov, N. I.

[PROBLEMS OF ORGANIC EVOLUTION IN THE LIGHT OF RECENT STUDIES OF THE PLANETS] Problema organicheskoi evoliutsii v sovremennom planetovedenii. — Akademiia nauk kazakhskoi SSR (Alma-Ata), Trudy sektora astrobotaniki, 5: 118-125. 1957. In Russian. DLC (QK1.A35866, v. 5)

We possess a considerable amount of reliable information pertaining to the physical and chemical conditions on the planets of the solar system but not too many data on the evolution of these planets, their lithospheres, hydrospheres, and atmospheres. The study of organic evolution being the task of general biology, it is imperative that this branch of science should solve the problems of cosmic life. According to present theories, life on Earth has existed for some 3-4 billion years. Jupiter and Saturn manifest a state of evolution corresponding to the precellular and unicellular evolutionary periods of the Earth, while Venus is now in its paleozoic period. Mars shows high organic life forms capable to sustain severe conditions. It is highly improbable that the Moon sustains any life, although the possibility cannot be excluded. Mars, being the best known planet, may have also animated life, if one may draw analogies to the evolutionary laws on Earth. Yet the possibility of animated life on Mars is disputed among the authors; from the point of view of evolution it is to be assumed that only vegetal life exists there. Since energy is needed to sustain life, and such energy is stored by plants, two types of nutrition are possible — autotrophic and heterotrophic. This

presupposes the existence of photosynthetic organisms (plants). Spectrographic and, more recently, isotope studies reveal that not all plants have the same ability to develop chlorophyll. With the advance of interplanetary travel it was shown experimentally that corn will grow under climatic conditions similar to those existing on Mars.

6793

Tikhov, G. A.

[ON N. A. KOZYREV'S ARTICLE "EXPLANATION OF THE COLOR OF MARS BY SPECTRAL PROPERTIES OF ITS ATMOSPHERE"] Po povodu stat'i N. A. Kosyrev'a "Ob'iasnenie tsveta Marsa spektral'nymi svoistvami ego atmosfery". — Akademiia nauk kazakhskoi SSR (Alma-Ata), Trudy sektora astrobotaniki, 5: 3-5. 1957. In Russian. DLC (QK1.A35866, v. 5)

The author criticizes the article on the color of Mars by N. A. Kosyrev. The fallacy of the article is obvious from several statements and logarithmic curves and tables supplied by Kosyrev. The dispute arises as to the coloring of the seas and the areas of vegetation, and it is improbable that the color of Mars is derived from its own atmosphere.

6794

Whitaker, E. A.

THE MOON—EARTH'S NEAREST NEIGHBOUR. — *Spaceflight* (London), 1 (2): 52-60. Jan. 1957. DLC (TL787.B725, v. 1)

The Moon is, apart from its surface irregularities, an almost exactly spherical body, 2160 miles in diameter. Only about 1/81 as massive as the Earth, its mean density is slightly less than 3-1/2 times that of water, and the gravitational pull at its surface is only 1/6 of that at the Earth's surface. It is postulated that the Moon possesses neither atmosphere, nor water in any form; however, theories have been propounded to account for lunar features which require the presence of ice, or the presence of large quantities of water in the past. The Moon's surface markings and topographical details are discussed, and representative photographs included.

g. Origin of Life and Evolution

6795

Gulick, A.

PHOSPHORUS AND THE ORIGIN OF LIFE. — *Annals New York Acad. Sci.*, 60 (2): 309-313. Aug. 1957. DLC (Q11.N5, v. 60)

The importance of phosphorus as a means of transferring cellular energy and as a contributor to the formation of the nucleic acids necessary for self-replicating molecules is discussed. Assuming that self-replication was the same in the beginning as now, then the question arises as to the source of phosphorus that was readily available to the first living organisms. Although phosphorus is plentiful in nature, it is not freely available to organisms. The phosphates, being a more common form found in cells, are fully oxidized forms of phosphorus and are highly insoluble in water. Hence, these were probably not the forms that were first available. The author suggests that some type of hypophosphite, a highly

soluble and less oxidized form, was the first assimilable phosphorus compound found in the seas. These hypophosphites were possibly derived from the oxidation of phosphides found in the rock crust. The environment that would allow these less oxidized forms of phosphorus to become widely distributed is discussed. It is possible that sulfur or iron was playing the role of phosphorus in the beginning of organic life. (25 references)

6796

Hasselstrom, T.,

M. C. Henry, and B. Murr

SYNTHESIS OF AMINO ACIDS BY BETA RADIATION. — *Science* (Washington), 125 (3243): 350-351. Feb. 22, 1957. DLC (Q1.S35, v. 125)

The formation of amino acids (glycine and aspartic acid) is reported by using the method of irradiation of acetic acid and inorganic acetates with 10, 20, 30, and 50 Mrep of beta radiation. A discussion of the chemical reactions involved is included as well as the chromatographic method of determination of the amino acids.

6797

Miller, S. L.

THE FORMATION OF ORGANIC COMPOUNDS ON THE PRIMITIVE EARTH. — *Annals New York Acad. Sci.*, 69 (2): 260-275. Aug. 1957. DLC (Q11.N5, v. 69)

By either silent or spark-type electrical discharges in a mixture of hydrogen, ammonia, methane, and water there are produced hydroxy, aliphatic, and amino acids. With the silent discharge the yield is one-fourth less of the same products than with sparks. Hydrogen cyanide and aldehydes, both direct products of the electrical discharge, react to produce aminonitriles which in turn would be hydrolyzed to an amino acid. It is suggested that ultraviolet light could be the energy source in the absence of an electric spark for the synthesis of organic compounds in the earth's beginnings. These compounds would have been synthesized in the presence of a reducing atmosphere, but their origin in an oxidizing atmosphere is doubted. (34 references)

6798

Paschke, R.,

R. W. H. Chang, and D. Young
PROBABLE ROLE OF GAMMA IRRADIATION IN ORIGIN OF LIFE. — *Science* (Washington), 125 (3253): 881. May 3, 1957. DLC (Q1.S35, v. 125)

By irradiating ammonium carbonate with gamma rays at dosages of about 500 Mrep, the first known production of amino acids (glycine and possibly alanine) in the absence of free hydrogen is reported. Gamma irradiation, whether a massive dose as used here is necessary or not, is a more probable agent than sunlight or lightning in generating complex organic molecules. It is postulated that once these amino acids were formed they could have been protected from radioactive destruction by being immersed in the oceans where further molecular complexes could have developed.

3. GENERAL PHYSIOLOGY

[Environmental effects under 6]

b. Cardiovascular Physiology

6799

Bouverot, P.,

Ch. Jacquemin, J. Colin, and R. Flandrois
[VARIATIONS IN ARTERIAL SYSTOLIC PRESSURE
BY DIFFERENT METHODS OF INTRAPULMONARY
POSITIVE PRESSURE] Variations de la pression
artérielle systolique chez l'homme au cours de dif-
férentes modalités de surpression intrapulmonaire.
—Journal de physiologie (Paris), 49 (1): 59-62.
Jan.-March 1957.

Effects of positive intrapulmonary pressure pro-
duced by physical activity and by positive pressure
breathing was studied in 50 young subjects. Under
positive pressure breathing the arterial systolic
pressure increased in proportion to the value of the
intrapulmonary pressure, while cardiac frequency
hardly changed. The results of the Flack test showed
that physical activity produced a more rapid increase
in systolic pressure of longer duration and a rise of
cardiac frequency. It appears that the modifications
obtained are not comparable to those observed in
anesthetized animals.

6800

Coles, D. R.

HEAT ELIMINATION FROM THE TOES DURING EX-
POSURE OF THE FOOT TO SUBATMOSPHERIC
PRESSURES.—Jour. Physiol. (London), 135 (1): 171-
181. Jan. 1957. DCL (QP1.J75, v. 135)

Same as item no. 5836, vol. V.

6801

Hansen, D. B.,

1957

M. R. Sultz, W. H. Freygang, and L. Sokoloff
EFFECTS OF LOW O_2 AND HIGH CO_2 CONCENTRATIONS
IN INSPIRED AIR ON LOCAL CEREBRAL CIRCULATION [Abstract]. — Federation
Proceedings, 16 (1, part 1): 55. March 1957.

DLC (QH301.F37, v. 16)

Cats were permitted to breathe experimental gas
mixtures introduced at a rate of 15 liters per
minute into a lucite box fitted over their heads.
A 15-minute equilibrium period was allowed before
the experimental procedure was performed. Similar
experiments were done on control animals
breathing room air. The results show a moderate
increase of blood flow in all cerebral tissues pro-
duced by the inhalation of 5% CO_2 and a marked
increase produced by 10% CO_2 . The effects of 10%
 O_2 were intermediate. Although the increase in
blood flow produced by these inspired gas mixtures
was distributed in both gray and white matter of
the spinal cord, the results thus far indicate that
the percentage increase in gray matter was greater
than in white.

6802

Kogan, I. R.

[A METHOD OF MEASURING BLOOD PRESSURE
AND HEART RATE IN THE ALTITUDE CHAMBER]
Metod izmereniia arterial'nogo davleniia i chastoty
pul'sa pri issledovaniakh v barokamere. — Voenno-
meditsinskii zhurnal (Moskva), 1957 (1): 82-83.
Jan. 1957. In Russian. DLC (RC970.V55, v. 1957)

A method is described which enables an observer
outside a low-pressure chamber to perform
sphygmomanometric measurements of pulse rate
and blood pressure of a person exposed to 5,000-
12,000 m. simulated altitude.

6803

Lewis, D. H.,

and A. M. Stoll

THE EFFECTS OF EXTERNAL PRESSURIZATION
UPON THE CARDIOVASCULAR SYSTEM IN DOGS.
I. PHYSIOLOGICAL ASPECTS. — Naval Air Develop-
ment Center. Aviation Medical Acceleration Lab.,
Johnsville, Pa. (Project no. NM 11 01 12.1, Report
no. 3). Report no. NADC-MA-5709, July 23, 1957.
iv+15 p. AD 139 874 UNCLASSIFIED

Studies of the effects of external pressurization on
the cardiovascular system were carried out in 16
anesthetized dogs. Observations were made of ap-
plied pressure at the surface of the abdomen, of rec-
tal pressure, and of various vascular pressures dur-
ing inflation of a bag type of "suit" which encased the
entire lower half of the animal's body up to the
sternum. With inflations in the range of 1 to 5 p.s.i.
for 5 to 10 seconds, the pressure changes suggest an
increase in venous return, an increase in peripheral
resistance, and a probable increase in intrathoracic
blood volume. (Authors' abstract)

6804

Meehan, J. P.,

and H. I. Jacobs

EFFECT OF HYPNOTIC SUGGESTION ON COLD
VASODILATATION [Abstract]. — Physiologist, 1 (1):
60. Nov. 1957. DNLM

In order to control the factor of emotional attitude,
hypnotic suggestions of anesthesia, lack of discom-
fort, extreme discomfort, and anxiety were given to
subjects whose fingers were immersed in ice water.
Finger skin temperatures were recorded potenti-
ometrically. Under controlled conditions, the hypnotic
suggestions employed modified the response of any
given subject studied to a marked degree. In partic-
ular, the onset of rewarming and the shape of the
rewarming curve showed the greatest modification.
Also, consistent changes in the blood flow of the
contralateral fingers were observed. It is concluded
that the central nervous system can play a significant
role in the determination of the occurrence of cold-
induced vasodilatation and therefore may also play
an important role in determining resistance to cold
injury. (Authors' abstract, modified)

6805

Turner, J.,

1957

C. J. Lamberts, S. G. Owen, H. Wendel, and
H. Chiodi

EFFECTS OF .08 AND .8 ATMOSPHERES OF
INSPIRED PO_2 UPON CEREBRAL HEMODYNAM-
ICS AT A "CONSTANT" ALVEOLAR pCO_2 OF
43 mm Hg [Abstract]. — Federation Proceedings,
16 (1, part 1): 130. March 1957.

DLC (QH301.F37, v. 16)

Inhalation of 8, 21, and 80% oxygen at 1 atmos-
phere was carried out at an alveolar carbon di-
oxide tension (pCO_2) adjusted in 6 normal sub-
jects to a mean of 43 mm. Hg in each of the

experimental conditions. In the absence of significant alterations of alveolar or arterial $p\text{CO}_2$, 80% O_2 produced no change in brain circulation or cerebral vascular resistance from control levels obtained during 21% O_2 breathing. This suggests that the cerebral vasoconstriction normally associated with O_2 inhalation is predominantly an indirect effect, secondary to arterial hypocapnia. Inhalation of 8% O_2 , resulting in arterial and cerebral venous $p\text{O}_2$ of 39 and 38 mm. Hg, respectively, decreased cerebral vascular resistance 20%, increased brain blood flow 36%, and left cerebral oxygen consumption unaltered. The observed degree of cerebral vasodilatation represents the action of low $p\text{O}_2$, unmodified by antagonistic effects of the hypocapnia normally associated with hypoxia. (Authors' abstract, modified)

6806

Wever, R.,
and J. Aschoff

[HEAT CONDUCTION VALUE AS A MEASURE OF CIRCULATION IN MAN] Die Wärmedurchgangszahl als Durchblutungsmass am Menschen.—Pflügers Archiv für die gesamte Physiologie (Berlin), 264 (3): 272-279, 1957. In German. DLC (QP1.A63, v. 264)

A method is described which allows the measurement of intensity of heat flow at the body surface, the difference in temperature between the core and the surface, and the ratio between them. The ratio represents the value of heat conduction. As established by measurements on the glass hand model and on the fingers of 20 subjects, this ratio is directly proportional to circulation. Individual differences were not found. The level of the core temperature, skin temperature, and room temperature as well as the method used to insulate the arm did not affect this ratio. (Authors' summary, modified)

c. Respiratory Physiology

[Effects of anoxia under 6-d; Respiratory metabolism under 3-d]

6807

Adelman, W. J.,
and D. Criscuolo

THE SARNOFF PHRENIC STIMULATION TECHNIC FOR PRODUCING EXPERIMENTAL HYPERVENTILATION IN ANIMALS: A PRELIMINARY REPORT.—School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 57-68, Feb. 1957. 4 p. AD 143 447 PB 132 172

Electrophrenic hyperventilation of lightly anesthetized cats was achieved using a standard unmodified laboratory stimulator. Complete dominance of electrophrenic ventilation over spontaneous breathing was seen only in more deeply anesthetized cats. Electrophrenic hyperventilation (high arterial pH; low arterial PCO_2) could be maintained for at least one hour in lightly anesthetized animals, but there was some tendency for spontaneous breathing to interfere with achieving very large increases in minute volume. (Authors' abstract)

6808

Asmussen, E.,
and M. Nielsen

VENTILATORY RESPONSE TO CO_2 DURING WORK AT NORMAL AND AT LOW OXYGEN TENSIONS.—

Acta physiologica scandinavica (Stockholm), 39 (1): 27-35, 1957. In English. DNLHM

The sensitivity of the respiratory center to CO_2 during muscular work at normal and at low oxygen tensions was studied in three human subjects. It was found that the rectilinear part of the stimulus-response curves in normal air was displaced to the left of the resting curve and the more so the higher the work intensity. The steepness of the curves was in the majority of cases about the same. In low oxygen the stimulus-response curves were displaced more to the left and were much steeper than for the same work intensity in normal air. The flattening of the stimulus-response curves found at higher CO_2 concentrations is assumed to be due mainly to a special depressant effect of high CO_2 tension on the respiratory center. (Authors' summary)

6809

Baker, S. P.,
and F. A. Hitchcock

IMMEDIATE EFFECTS OF INHALATION OF 100% OXYGEN AT ONE ATMOSPHERE ON VENTILATION VOLUME, CARBON DIOXIDE OUTPUT, OXYGEN CONSUMPTION AND RESPIRATORY RATE IN MAN. — Jour. Applied Physiol., 10 (3): 363-366, May 1957. DLC (QP1.J72, v. 10)

Immediate effects of inhalation of 100% oxygen at one atmosphere on respiration in man were studied. Average increases of 6.4, 6.5 and 11.5%, respectively, were obtained in ventilation volume, carbon dioxide output and respiratory rate when the subjects breathed 100% oxygen; with subsequent decreases of 10.5, 11.2 and 7.5%, respectively, occurring on transfer back to outdoor air. These effects were attributed to a partial loss of the "dual function" of hemoglobin. Increased ventilation and carbon dioxide output while breathing 100% oxygen was attributed to stimulation of the medullary respiratory center by increased carbon dioxide tension and increased hydrogen ion concentration; decreased ventilation and retention of carbon dioxide resulted on return to outdoor air from a decreased carbon dioxide tension and hydrogen ion concentration. An increase in respiratory quotient of 42.1% and a decrease in oxygen consumption of 25.8% in breathing outdoor air after oxygen as compared to outdoor air before oxygen indicated a storage on oxygen in the body fluids during the 10 minutes of respiration on 100% oxygen. Control experiments with outdoor air demonstrated successive mean increases in all factors evaluated. (Authors' abstract)

6810

Balke, B.,
J. P. Ellis, and J. G. Wells

STUDIES ON ADAPTIVE RESPONSES TO HYPERVENTILATION.—School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 57-113, June 1957. 13 p. AD 140 530 UNCLASSIFIED

A standardized hyperventilation test procedure was employed to reveal alterations of psychomotor performance in relation to cardiovascular, respiratory, and biochemical responses during gradually increased hypocapnia under various experimental conditions. After normal control patterns had been established, the hypocapnic tolerance of six individuals was retested (1) after 2 weeks' training in hyperventilation, (2) after 8 weeks' training for physical conditioning, (3) during a state of severe physical fatigue, (4) at an altitude of 14,000 feet after sufficient acclimatization,

and (5) following return to sea level. Hypocapnia tolerance was substantially improved by training in hyperventilation. However, the adaptive mechanisms were apparently not of biochemical nature and are still a matter of speculation. (From the authors' summary)

- 6811
Bartlett, R.G., 1957
and H. Specht

ENERGY COST OF BREATHING DETERMINED WITH A SIMPLIFIED TECHNIQUE [Abstract]. — Federation Proceedings, 16 (1, part 1): 8, March 1957. DLC (QH301.F37, v. 16)

The ventilatory volume was self-regulated at various levels by requiring the subject to rebreathe through various dead space volumes at a predetermined breathing rate. The dead space was inserted between the subject and a Sanborn Metabulator by which the oxygen consumption was measured. With this very simple apparatus consistent results were easily and quickly obtained. The pulmonary minute volume and O_2 uptake at higher ventilatory volumes are expressed as increments over the resting levels, which appeared to reduce the scatter of the points on a two-dimensional plot, and therefore produced a simplification of the curve of best fit. Extrapolation of such a visually fitted curve for a single subject showed the cost of resting ventilation to be .5 cc./liter. The energy cost of breathing at 50 liters ventilation was .8 cc./liter and that at 80 liters 2.0 cc./liter.

- 6812
Bligh, J.
LOCALIZATION OF THE THERMAL STIMULUS TO POLYPNOEA [Abstract].—Jour. Physiol. (London), 135, 48P-49P. 1957. DLC (QP1.J75, v. 135)

A calf was fitted with a mask over the mouth and nose to detect any change in respiratory rate at increased temperatures of the air breathed and to reveal the possible presence of thermoreceptors in the respiratory tract. When the temperature in the mask was 20° C. above the room temperature, only a slight increase in respiration occurred; but when the temperatures were reversed, the respiratory response was three times as great. It appears that warming of the naso-buccal area is no more effective than warming an equivalent area of skin.

- 6813
Bouhuys, A.,
R. Jönsson, and G. Lundin
INFLUENCE OF ADDED DEAD SPACE ON PULMONARY VENTILATION.—Acta physiologica scandinavica (Stockholm), 39 (2-3): 105-120. 1957. DNLN

Hyperventilation due to extra dead space did not cause any significant improvement in ventilatory efficiency as measured in nitrogen wash-out experiments during oxygen breathing. In the experiments with extra dead space a significant increase in degree of uniformity of ventilation could be demonstrated. The subject's dead space increased, and the over-all efficiency remained constant. The efficiency-improving effect of a better distribution and the efficiency-deteriorating effect of a larger dead space are most probably cancelled out. The better distribution is probably explained by the effect of mixing of gas from different lung fractions in the large dead space. The experiments were performed with a nitrogen meter. (Authors' summary)

- 6814
Boylan, J. W.,
and D. E. Antkowiak
EFFECTS OF NEGATIVE PRESSURE BREATHING ON RENAL EXCRETION OF FREE WATER AND TOTAL SOLUTE [Abstract].—Physiologist, 1 (1): 13. Nov. 1957. DNLN

Normal subjects were exposed to negative pressure breathing at -15 cm. water for 30-45 minutes. Results confirm the diuretic effect noted by others under conditions of moderate hydration. This is associated with an absolute increase in the excretion of free water and occurs without change in plasma osmotic pressure. Inulin and para-amino-hippuric acid clearance both rose in the first 15 minutes of negative pressure breathing, but returned to control levels thereafter. In the hydropenic state (at least twelve hours without water) one of two results may be obtained. There may be no change, or an increase in urine flow which parallels an increased solute excretion without change in the free water clearance. This latter effect is seen occasionally and unpredictably during moderate hydration. More variable results were obtained during maximal water diuresis and hydration plus Pitressin infusion. (Authors' abstract, modified)

- 6815
Braunwald, E.,
J. T. Binlon, W. L. Morgan and S. J. Sarnoff
ALTERATIONS IN CENTRAL BLOOD VOLUME AND CARDIAC OUTPUT INDUCED BY POSITIVE PRESSURE BREATHING AND COUNTERACTED BY METARAMINOL (ARAMINE).—Circulation Research, 5 (6): 670-675. Nov. 1957. DLC (RC681.A1A57137, v. 5)

In 18 dogs subjected to positive pressure breathing (PPB, mean airway pressure, 25 cm. of water) cardiac output fell an average of 72%, central blood volume fell an average of 35%, and mean femoral arterial pressure fell an average of 56%. Administration of metaraminol substantially elevated these lowered values while PPB was maintained. The beneficial effects observed are thought to be attributable to this drug's influence on venous and arteriolar tone and myocardial contractility. The mechanism of the circulatory depression produced by PPB is discussed. (Authors' summary, modified)

- 6816
Butler, J.
THE ADAPTATION OF THE RELAXED LUNGS AND CHEST WALL TO CHANGES IN VOLUME.—Clinical Sci. (London), 16 (3): 421-433. 1957. DNLN

The pressure-volume diagram of the total respiratory system of the lungs and chest wall was studied in 19 anesthetized and relaxed persons with normal chests. A hysteresis effect was evident in the pressure-volume relationships of the total respiratory system and chest wall when stepwise inflation and deflation was carried out. A hysteresis-like effect was shown by the lungs alone, since, though pressures on inflation were greater than those on deflation, no residual deformation was present when the initial airway was resumed. The hysteresis effect of the chest wall was probably due to stretching of muscles and ligaments; the similar phenomenon in the lungs may be due to the overcoming of surface tension forces and the opening up and closing down of additional alveolar volumes during inflation and deflation. (From the author's summary)

6817

Butler, J.,

H. C. White and W. M. Arnott
THE PULMONARY COMPLIANCE IN NORMAL SUBJECTS.—*Clinical Sci. (London)*, 16 (4): 709-729. 1957. DNLN

The wide range of pulmonary compliance from the static and the spiral record of 33 normal subjects (aged 19-74; 7 female, 26 male), was standardized in relation to the estimated total lung volume and expressed as distension pressure. Values of compliance and distension pressure from repeated estimations in individuals also varied, though to a lesser extent. The static records of pressure and volume during expiration showed more positive pressure (smaller transpulmonary pressures) than the records of inspiration at corresponding volumes. A fall in the transpulmonary pressure was recorded when the lung volume was kept constant for periods longer than about 5 seconds. Both the static records yielded a curvilinear S-shaped pressure volume relationship when followed throughout the vital capacity volume. Variation of ventilated lung tissue dependent on the overcoming of surface tension forces may explain these phenomena. (From the authors' summary) (41 references)

6818

Cormack, R. S.,

D. J. C. Cunningham, and J. B. L. Gee
THE EFFECT OF CARBON DIOXIDE ON THE RESPIRATORY RESPONSE TO WANT OF OXYGEN IN MAN.—*Quart. Jour. Exper. Physiol. (London)*, 42 (3): 303-319. July 1957. DNLN

Ventilation, respiratory frequency, and alveolar gas pressures were measured during anoxia in seven men, alveolar carbon dioxide pressure being maintained at or above the normal level. A given degree of anoxia caused a significantly greater respiratory response at a higher level of carbon dioxide pressure in all subjects. This contradicts Gray's hypothesis that respiratory stimuli do not interact. (From the authors' abstract) (39 references)

6819

Cunningham, D. J. C.,

and J. L. H. O'Riordan
THE EFFECT OF A RISE IN THE TEMPERATURE OF THE BODY ON THE RESPIRATORY RESPONSE TO CARBON DIOXIDE AT REST.—*Quart. Jour. Exper. Physiol. (London)*, 42 (4): 329-345. Oct. 1957. DNLN

Five resting subjects were exposed to a hot humid environment in order to raise their rectal temperatures by 1.1° - 2.9° C., which were then maintained for 20-100 minutes. A steady raised temperature (1) over a range of alveolar carbon dioxide tension ($p\text{CO}_2$) that included normal and raised values increased carbon dioxide sensitivity approximately twofold; (2) at the normal alveolar $p\text{CO}_2$ increased the ventilation by 3-16 liters/minute; and (3) in air-breathing experiments produced only a slight hyperpnea and a fall of alveolar $p\text{CO}_2$. When temperature was rising there was apparently no correlation between the magnitude of the response and the rate of rise of temperature. When alveolar $p\text{CO}_2$ was allowed to fall, as temperature became steady the ventilation declined from the peak reached in the non-steady state, but when $p\text{CO}_2$ was controlled the decline was usually small or absent. (From the authors' summary) (31 references)

6820

Cunningham, D. J. C.,

R. S. Cormack, J. L. H. O'Riordan, M. G. M. Jukes, and B. B. Lloyd
AN ARRANGEMENT FOR STUDYING THE RESPIRATORY EFFECTS IN MAN OF VARIOUS FACTORS.—*Quart. Jour. Exper. Physiol. (London)*, 42 (3): 294-303. July 1957. DNLN

An apparatus is described which permits control of the alveolar pressures of oxygen and carbon dioxide in the face of changes in ventilation and respiratory exchange, and has been used to investigate the relations between pulmonary ventilation and alveolar gas pressures under various conditions. The subject may be supplied with a gas mixture of any desired composition, which may be rapidly changed. The volume of expired air is recorded continuously, alveolar carbon dioxide pressure may be determined continually, and alveolar oxygen pressure determined at any time after direct sampling into a Haldane apparatus. (From the authors' abstract)

6821

Cuypers, Y.,

and E. Evrard

[THE EFFECT OF THE CIRCULATION ON OXYGEN POISONING] L'influence de la circulation sur l'intoxication par l'oxygène.—In: The first European congress of aviation medicine, p. 59-68. *Aeromedica acta* (Soesterberg, Netherlands), Special edition, 1957. In French. DNLN

Also published in: *Médecine aéronautique* (Paris), 12 (1): 59-67. 1957. In French, with English summary (p. 66). DLC (TL555.M394, v. 12)

Inhalation of 100% oxygen at a pressure of 760 mm. Hg produced a decrease in the oxygen consumption of a segment of the skin surface greatly vasodilated. No effect was found in skin areas with normally vascularized surface. Numerous procedures (thyroidectomy, cold, etc.) and drugs (cystamine, cysteamine, etc.) which protect against oxygen poisoning appear to be effective, at least partially, in decreasing the circulation.

6822

De Coster, A.,

and H. Denolin

[RESPIRATORY CHANGES FOLLOWING THE INHALATION OF PURE OXYGEN IN NORMAL AND EMPHYSEMATOUS SUBJECTS] Modifications respiratoires consécutives à l'inhalation d'oxygène pur chez les sujets normaux et les emphysemateux.—*Revue française d'études cliniques et biologiques* (Paris), 2 (2): 129-144. Feb. 1957. In French. DNLN

Ventilation rate, carbon dioxide excretion rate, arterial blood pH, the partial pressure of carbon dioxide in arterial blood or alveolar air, and the alveolar ventilation calculated from the Enghoff-Rossier equation, were determined in twenty normal subjects and mean values calculated. Individual variations were considerable. Inhalation of 100% oxygen altered the ventilation rate, and alveolar ventilation was slightly reduced at the same time as the production of carbon dioxide diminished. On the whole, variations found with 100% oxygen were scarcely outside the range of spontaneous variations.

6823

Dejours, P.

[METHODOLOGICAL SIGNIFICANCE OF THE STUDY OF A LIVING ORGANISM AT THE INITIAL

STAGE OF CHANGING A PHYSIOLOGICAL EQUILIBRIUM] Intérêt méthodologique de l'étude d'un organisme vivant à la phase initiale de rupture d'un équilibre physiologique. — *Comptes rendus de l'Académie des sciences (Paris)*, 245 (23): 1946-1948. Nov. 25, 1957. In French.

DLC (Q46.A14, v. 245)

A consistent method is presented for studying respiratory responses to the sudden increase of arterial oxygen pressure (such as is caused by sudden inhalation of pure oxygen), and the existence of a ventilatory oxygen stimulus. The ventilatory change which results in a sudden increase in arterial oxygen pressure is maximal after several seconds, the lapse of time corresponding to the pulmonary-chemoreceptor circulatory delay. If the inhalation of pure oxygen is prolonged, secondary reactions occur which tend to decrease the disturbing effects of hyperoxygenation and make interpretation of the ventilatory change difficult.

6824

Errebo-Knudsen, E. O.

HYPERVENTILATION.—In: The first European congress of aviation medicine, p. 153-158. *Aeromedica acta* (Soesterberg, Netherlands), Special edition, 1957. In English. DNLM

Essentially the same as item no. 5330, vol. V.

6825

Fleisch, A.,

and P. Haab

[RESPIRATORY VOLUME AND THE VENTILATORY EQUIVALENT FOR OXYGEN MEASURED AT REST]

Le débit ventilatoire et l'équivalent ventilatoire pour l'oxygène mesurés à l'état basal.—*Acta physiologica et pharmacologica néerlandica* (Amsterdam), 6: 215-225. 1957. In French. DNLM

The measurement of respiratory volume at rest shows values lower than those found in the literature. To obtain these results it is necessary to use an apparatus which permits constant control of the respiratory quotient, is able to detect hyperventilation, and can prolong registrations until the state of equilibrium is realized. On the other hand, when measuring the ventilation in oxygen-rich air, the results are 4% higher than those registered in atmospheric air. A decreased ventilatory volume and the ventilatory equivalent for less oxygen are tabulated and discussed.

6826

Ghiringhelli, G.,

E. Bosisto, and M. Pasargiklian

[EFFECT OF RESPIRATORY FREQUENCY ON MAXIMUM PULMONARY VENTILATION VOLUMES]

L'influenza della frequenza respiratoria sui volumi di ventilazione polmonare massima.—*Rivista di medicina aeronautica* (Roma), 20 (1): 3-36. Jan.-March 1957. In Italian, with English summary (p. 33). DLC (RC1050.R56, v. 20)

Maximum pulmonary ventilation capacity was recorded in 40 males between 20-30 years of age during increased respiratory frequency (regulated by a metronome). An increase in ventilation volumes was observed up to 100 breaths per minute. For additional increases in respiratory rate the values remained fairly steady. Studies on the localization of tidal volume in the different fractions of vital capacity at various rates show a trend to ventilate the inspiratory reserve during performance of the test; at rates higher than 100 breaths per minute subjects breathed,

as a mean, only inspiratory reserve air. At respiratory rates higher than 200 breaths per minute, subjects never breathed a tidal volume lower than their tidal volume at rest, indicating that not only volume corresponding to respiratory dead space is ventilated at each breath. A comparison of the highest volumes of ventilatory capacity obtained in the test and the values measured at a free rate or free depth reveals almost identical results for both methods. (Authors' summary, modified) (54 references)

6827

Grandpierre, R.,

R. Bouverot, C. Jacquemin, and J. Colin

[MECHANISMS OF VASO-MOTOR ACTIONS IN ANESTHETIZED ANIMALS SUBJECTED TO POSITIVE PRESSURE BREATHING] Mécanismes des actions vaso-motrices chez l'animal anesthésié soumis à la respiration en surpression.—*Journal de physiologie* (Paris), 49 (1): 179-180. Jan.-March 1957. DNLM

A review is given of work concerned with vaso-motor effects of pressure breathing on blood pressure in animals. In the dog it appears that with ablation of the efferent vaso-motors an increase in pressure is retarded, while loss of the afferent arterial baroreceptors produces a transitory vaso-dilatation at the start of pressure breathing. In effect, pressure breathing ultimately causes hypotension, which is compensated for by a vaso-constriction initiated by the aortic baroreceptors. This mechanism seems different from that of man where positive pressure breathing produces arterial hypertension.

6828

Grandpierre, R.,

P. Bouverot, J. Colin, and C. Jacquemin

[VASOMOTOR REACTIONS CAUSED BY POSITIVE PRESSURE BREATHING: DEMONSTRATION OF A CONTROL TEST IN MAN] Réactions vasomotrices dues à la respiration en surpression: mise au point d'un test de contrôle chez l'homme.—In: The first European congress of aviation medicine, p. 33-47.

Aeromedica acta (Soesterberg, Netherlands), Special edition, 1957. In French. DNLM

Also published in: *Médecine aéronautique* (Paris), 12 (1): 5-22. 1957. In French, with English summary (p. 22). DLC (TL555.M394, v. 12)

Dogs under positive pressure breathing with their paw perfused *in situ* demonstrated an immediate adrenergic vasomotor reaction (hypotension followed immediately by compensatory vasoconstriction). Human subjects under positive pressure breathing were given a battery of circulatory function tests to determine adrenal reaction. Cardiac frequency and maximum arterial pressure were recorded simultaneously. Preliminary results on 25 subjects need confirmation but demonstrate blood-pressure changes essentially due to vasomotor phenomena. This method may possibly be applied to pilot selection procedures, medical supervision and indoctrination during training of flying personnel, and to the biological evaluation of various pressure suits.

6829

Grognot, P.,

and R. Senelar

[EXPERIMENTAL STUDIES ON THE EARLY HISTOLOGICAL REACTIONS OF THE LUNG AFTER OXYGEN INHALATION] Etudes expérimentales sur les réactions histologiques précoces du poumon après inhalation d'oxygène.—*Revue médicale de Nancy*, 82

(78): 925-931. Aug.-Sept. 1957. In French, with English summary (p. 931). DNLM

Rats and guinea pigs breathed pure oxygen for 1-1/2 hours to 11 hours. Macroscopic examination of the lungs of these animals revealed diffuse congestion and purpura. Histological lesions were variable but appeared as vascular, alveolar, and cellular modifications. Oxygen inhalation from 1-1/2 to 3 hours produced important pulmonary capillary dilation, but no serous exudation or hemorrhage; from 3 to 6 hours, significant congestion with hemorrhage; and after 6 hours permanent changes. A level of 80% oxygen was found necessary to induce pulmonary lesions, 60-45% produced limited reactions. Administration of chlorpromazine and antihistaminics limited the inflammatory pulmonary reaction associated with oxygen inhalation. However, the lesions progressed under the effect of histamine and ACTH injections given the animals prior to oxygen inhalation.

6830

Hall, A. L.,
and H. R. Kelley
THE EFFECT OF SHOUTING ON BLOOD OXYGEN AND ALVEOLAR CARBON DIOXIDE.—Naval School of Aviation Medicine, Pensacola, Fla. (Research Project no. NM 12 01 11, Subtask 3.) Report no. 1, Nov. 15, 1957. ii+13 p. AD 203 323 UNCLASSIFIED

This paper is a report of an attempt to find word-per-exhalation combinations that would not decrease alveolar CO₂ tensions. The subjects repeated at certain intervals words whose articulation would result in maximal intrapulmonary pressure with minimal air flow. The results did not indicate a definite enough gain in CO₂ and O₂ to recommend this procedure in any emergency in which hypoxia and/or hypocapnia might be a contributing factor. (Authors' abstract) (23 references)

6831

Hall, F. G.,
and F. Zechman
EFFECTS OF RESPIRATORY IMPEDANCES ON PULMONARY VENTILATION, PATTERN OF BREATHING, AND PULMONARY GAS EXCHANGE IN DOGS.—Duke Univ. School of Medicine, Durham, N. C. (Contract AF 33(616)-377); issued by Wright Air Development Center, Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. (Project no. 7160). WADC Technical Report no. 56-840, May 1957. iii+12 p. AD 118 297 PB 131 163

This report covers three series of experiments conducted on 22 dogs to determine the respiratory effects of increased tracheal impedance to air flow. The influence of four different-size orifices on respiratory frequency, tidal volume, tracheal air flow and pressure, heart rate, blood pressure and arterial gas tension is presented. Additional experiments are reported which suggest the relative roles of the chemical and mechanical factors controlling the respiratory response to air flow impedance. (Authors' abstract)

6832

Hall, F. G.,
and L. C. Sappenfield
INFLUENCE OF GRADED IMPEDANCE TO TRACHEAL AIR FLOW ON TIMED VITAL CAPACITY MEASUREMENTS.—Jour. Aviation Med., 28 (4): 397-400. Aug. 1957.
DLC (RC1050.A36, v. 28)

Timed vital capacities were determined on nine healthy young men ranging in age from 21 to 38 years. Their normal vital capacities were determined, which varied on the average only 1% from predicted values. Subsequently, four different resistances were interposed between mouthpiece and vitalometer, and the volume of air which could be expelled into the vitalometer was determined. The reduction in the timed capacities varied proportionally with resistances imposed. This test gives a value which can be used to determine the degree of breathing obstruction in pulmonary efficiency tests. Moderate exercise during the tests does not appreciably affect the results. (Authors' summary)

6833

Harboe, M.,
and F. V. Lorentzen
VENTILATORY STUDIES OF THE LUNGS DURING CONTINUOUS PRESSURE BREATHING (CPB) [Abstract].—Acta physiologica scandinavica (Stockholm), 42, Supplement 145: 66. 1957. In English. DNLM

Pulmonary nitrogen clearance was investigated in five healthy subjects during continuous pressure breathing (CPB) of oxygen and in normal respiration. The findings show a normal and stable nitrogen clearance pattern in both conditions. Changes observed in the ventilation-perfusion relationship during the change-over to CPB may be attributed to changes in the blood perfusion through the lungs during CPB.

6834

Hohnen, H. W.,
and H. Klenesch
[BALLISTIC DETERMINATION OF THE STROKE VOLUME DURING LOWERED INTRAPULMONARY PRESSURE] Ballistische Bestimmung des Schlagvolumens bei Verminderung des intrapulmonalen Druckes.—Pflügers Archiv für die gesamte Physiologie (Berlin), 265 (3): 199-206. 1957. In German.
DLC (QP1.A63, v. 265)

The effect of lowered intrapulmonary pressure (Müller's experiment) on stroke volume was investigated by means of a ballistograph. The experiments were carried out with subjects after 1/2 hour's rest during sucking efforts in the normal expiratory position, in forced inspiration, and in forced expiration. The stroke volume in sucking during the normal expiration is a function of the level of the intrapulmonary pressure; it increases with decreasing pressure. Particularly noted was the relatively large increase of the stroke volume at minor decreases in pulmonary pressure. The stroke volume increases during sucking attempts in normal and deep expiration but is not changed or decreases during sucking in deep inspiration.

6835

Koreahkov, A. A.
[THE EFFECT OF PROLONGED PRESSURE BREATHING ON THE ANIMAL ORGANISM] Vliyanie na organism zhivotnogo dlitel'nogo dykhania pod povysheennym davleniem.—Zhurnal obshchei biologii (Moskva), 18 (1): 64-74. 1957. In Russian, with English summary (p. 73-74).
DLC (QH301.Z55, v. 18)

Prolonged pressure breathing (breathing of pure oxygen) increased the capacity of dogs to sustain for longer periods (up to 1 1/2 hours) an atmospheric pressure equivalent to 15,000 m. altitude. Changes in conditioned reflex activity revealed a loss of balance between excitatory and inhibitory

processes (weakening of conditioned inhibition and increasing manifestations of protective inhibition). Changes in the electrocardiogram and in respiratory functions were of a temporary nature.

6836

Lambertsen, C. J., 1957

H. Wendel, H. Chiodi, and S. G. Owen
RESPIRATORY EFFECTS OF .08 AND .8 ATMOSPHERES OF INSPIRED pO_2 AT A "CONSTANT" ALVEOLAR pCO_2 OF 43 mm Hg [Abstract]. — Federation Proceedings, 16 (1, part 1): 78. March 1957. DLC (QH301.F37, v. 16)

Eight, 21, and 80% O_2 were administered at 1.0 atmosphere to 6 normal subjects maintained at an alveolar pCO_2 of 43 mm. Hg. In the absence of alterations in arterial pCO_2 or pH, 8% O_2 produced a 26, and 80% O_2 a 15% increase in respiratory minute volume above the control values obtained during 21% O_2 breathing. The respiratory stimulation associated with 80% O_2 breathing was accompanied by a significant 1.6 mm. Hg rise in cerebral venous pCO_2 , reflecting a central hypercapnia which may have produced the "oxygen" hyperpnea. Since neither cerebral circulation nor cerebral metabolism was altered by 80% O_2 , the internal jugular venous hypercapnia was due to diminished hemoglobin reduction. The hypoxic hyperventilation of 8% O_2 breathing was associated with a 5 mm. Hg fall in cerebral venous pCO_2 , due to increased rate of brain blood flow. It is therefore possible that, in spite of a fixed arterial pCO_2 , the chemoreflex respiratory response to hypoxia is in part counteracted by a fall in central stimulus level, brought about by hypoxic cerebral vasodilatation. (Authors' abstract)

6837

McGuire, T. F.,

G. D. Talbott, D. A. Rosenbaum, J. M. Webber, and S. C. White

CARDIOVASCULAR EFFECTS OF BREATHING AGAINST UNBALANCED ATMOSPHERIC PRESSURES. — Jour. Amer. Med. Assoc., 13 (14): 1209-1213. April 6, 1957. DLC (R15.A48, v. 163)

The effects of applying unbalanced pressures to the head and body were studied in 56 airplane pilots. The head and upper airways of a given subject were exposed to varying pressures within a full-head pressure helmet while the trunk and extremities were exposed to independently adjustable pressures in a separate compartment. Both compartments contained 100% oxygen. When the pressure on trunk and extremities was reduced to that equivalent to an altitude of 40,000 ft. (12,200 m.), marked differences were found among the subjects as to their ability to maintain a normal pulse rate, normal electrocardiogram, and consciousness in the face of increasing difference of pressure between the two compartments. No significant relationship was found, however, between this ability and the results of physical fitness tests or anthropological groupings. The data suggested that unbalanced pressures acting upon the lungs reduce the efficiency of the coronary circulation and cause myocardial hypoxia. (Authors' summary)

6838

Magistretti, M.,

and E. Sartorelli

[MEASUREMENT OF THE OXYGEN SATURATION

OF ARTERIAL BLOOD IN VITRO BY THE SPECTROPHOTOMETRIC METHOD OF NAHAS] Misura della saturazione in O_2 del sangue arterioso in vitro con il metodo spettrofotometrico di Nahas. — Medicina del lavoro (Milano), 48 (5): 347-351. May 1957. In Italian, with English summary (p. 351). DNLM

The arterial oxygen saturation was measured by means of Nahas' spectrophotometric method. This method uses Lambert's law of optical absorption, in this case the oxygen saturation is proportional to the logarithm of the ratio between incident light and transmitted light. Comparison is made with the Brinkman method which is based on the reflection of a red light beam by a layer of blood: the amount of reflected light is proportional to the oxyhemoglobin concentration. (From the authors' summary)

6839

Marshall, R.

THE PHYSICAL PROPERTIES OF THE LUNGS IN RELATION TO THE SUBDIVISIONS OF LUNG VOLUME. — Clinical Sci. (London), 16 (3): 507-515. 1957. DNLM

A significant correlation was found between pulmonary compliance and functional residual capacity, residual volume, inspiratory capacity, body surface area and height in 50 young normal subjects at rest. The non-elastic resistance of the lungs also related to functional residual capacity and body surface area. (From the author's summary) (17 references)

6840

Marx, H. H.

[THE EFFECT OF OXYGEN IN A HEALTHY ORGANISM] Die Wirkung des Sauerstoffs im gesunden Organismus. — Sportmedizin (Freiburg im Breisgau), 8 (8): 222-225. Aug. 1957. In German. DNLM

The physiological function of oxygen in the organism is reviewed in view of research on the effects of oxygen breathing at rest and during or after physical stress. The following conclusions are reached: (1) since normally the oxygen saturation in blood approaches 97%, an excess oxygen supply increases, primarily, the venous oxygen saturation and the oxygen partial pressure by the physical solution of additional free oxygen in the blood; and (2) oxygen should not be supplied in concentrations exceeding 50 vol. % since no further improvement results, but undesirable side effects increase.

6841

May, P.

[THE IMMEDIATE ACTION OF OXYGEN ON THE VENTILATION OF NORMAL MAN] L'action immédiate de l'oxygène sur la ventilation chez l'homme normal. — Helvetica physiologica et pharmacologica acta (Basel), 15 (2): 230-240. 1957. In French, with English summary (p. 239). DNLM

The effects were studied on respiratory minute volume, respiratory rate, and tidal volume upon inhalation of a 60:40 oxygen-nitrogen mixture after breathing ordinary air. This study was performed during rest on 15 healthy adults. We found that passing from the breathing of normal air to that of the mixture had the following effects: During the first minute, a decrease of 19.5% occurs in the mean respiratory minute volume; during the second minute, a decrease of 11.7%; thereafter, it reverts to the value during air respiration. This decrease in respiratory minute volume is due primarily to a decrease in tidal volume, and secondarily to a decrease in respiratory rate. It is very likely that this phenomenon is induced

by the suppression of a hypoxemic stimulus of respiration which existed when the subjects were breathing air." (From the author's summary)

6842

Metz, J.,

and R. Garbagni

[VENTILATORY REACTIONS FOLLOWING THE INHALATION OF 70% OXYGEN] Les réactions ventilatoires consécutives à l'inhalation d'oxygène à soixante-dix pour cent.—Revue médicale de Nancy, 82 (78): 917-925. Aug.-Sept. 1957. In French. DNLM

Normal subjects breathed environmental air for 10 minutes followed by the inhalation of a 70% oxygen mixture for another 10 minutes. During the first minute of oxygen breathing a decrease in overall ventilation of 15% was found. During the following 4 minutes, over-all ventilation gradually returned to the initial value and during the last 5 minutes stabilized at a value slightly lower than the initial value (-7%). No change was observed in respiratory frequency, but arterial carbon dioxide tension showed an initial slight increase, and a 10% increase following 10 minutes of oxygen breathing. Alveolar ventilation appeared to be in a state of depression during the first minutes of oxygen breathing gradually returning to normal.

6843

Meyer, J. S.

STUDIES OF CEREBRAL CIRCULATION IN BRAIN INJURY. IV. ISCHEMIA AND HYPOXEMIA OF THE BRAIN STEM AND RESPIRATORY CENTER.—Electroencephalography and clinical Neurophysiol. (Montreal), 9 (1): 83-100. 1957. In English.

Concurrent studies of local blood flow, oxygen availability, steady potential (SP) and pH of the respiratory center and carotid body were made together with continuous recording of blood pressure and respiration in cats and monkeys. Anoxic anoxia first stimulates respiration by the carotid body reflex; if continued it damages the respiratory center, resulting in respiratory dysrhythmia and, finally, in respiratory arrest. 7% CO₂ and oxygen cause hyperpnea which appears to be mediated first by its action on the carotid body and later by its additional action on the respiratory center. Periodic breathing under these experimental conditions does not appear to be mediated by periodic fluctuations of oxygen availability of carotid body and respiratory center or rhythmic fluctuations in pH of the respiratory center. Rather it results from reversible anoxic damage to various levels of the brain stem. Brief carbon monoxide breathing lowers the oxygen saturation of the blood without reducing the partial pressure of blood oxygen; the oxygen dissolved in the plasma may provide a critical supply sufficient for the metabolic needs of the respiratory center as the normal oxygen-carrying capacity of the blood is slowly being restored. (Author's summary, modified)

6844

Mouriz, A.

[INTRAPERITONEAL PRESSURE IN THE STUDY OF RESPIRATORY MOVEMENTS] La presión intraperitoneal en el estudio de los movimientos respiratorios.—Revista española de fisiología (Barcelona), 13 (2): 131-146. June 1957. In Spanish, with English summary (p. 145). DNLM

A graphic record of intraperitoneal pressure was made as a means of evaluating respiratory movements as related to pleural pressure and pneumo-

tachogram curves. Insignificant changes in peritoneal pressure were observed throughout the respiratory cycle. The lowest peritoneal pressure values coincided with the beginning of respiration, with an increase toward the end of the inspiratory phase. During expiratory contraction the increase in peritoneal pressure was generally more accentuated than the final inspiratory increase. (Author's summary, modified)

6845

Pocidalo, J. J.,

J. Lissac, and C. Demongeot

[THE CIRCULATORY EFFECTS OF AN ABRUPT FALL OF THE PARTIAL PRESSURE OF PLASMA CARBON DIOXIDE IN THE DOG IN ACUTE HYPERCAPNIA] Effets circulatoires d'une baisse brutale de la pression partielle d'acide carbonique plasmatique chez le Chien en hypercapnie aiguë.—Comptes rendus de la Société de biologie (Paris), 151 (11): 1826-1829. Nov. 9, 1957. DLC (QP1.S7, v. 151)

Hypercapnia was induced in dogs in the awake state by intratracheal perfusion with oxygen for 35-60 minutes. In one group of animals, venous perfusion with sodium bicarbonate and reventilation brought about an abrupt fall of the partial pressure of carbon dioxide. A slight temporary decrease of the arterial pressure was observed, as well as a transient increase in pulse rate. Some modifications of the T wave were observed in the electrocardiogram, but ventricular fibrillation did not occur. A discussion is given of these observations and those of previous workers when hypercapnia was produced by inhalation of carbon dioxide.

6846

Prokop, L.

[RESPIRATORY FUNCTION AND EVALUATION OF THE PHYSICAL CONDITION] Atemfunktion und Konditionsbeurteilung.—Sportmedizin (Freiburg im Breisgau), 8 (8): 232-234. Aug. 1957. In German.

Respiratory adjustments to physical work are discussed in relation to maximum achievement in athletes and nonathletic subjects. In the nonathletic subject the adjustment of the respiratory minute volume is achieved primarily by an increase in the respiratory rate, while in the athletic individual it is maintained by an increase respiratory volume. The return of the respiratory function to the initial level after work is significantly faster in the athletes. Delayed return is suggestive of pathological changes, particularly in the cardiovascular system. Other respiratory adjustments include a shift to abdominal respiration and an adjustment of the respiratory rhythm. Respiratory adjustments become particularly important for work efficiency under hypoxic conditions, e.g., skiing, mountaineering, and high-altitude flight. Individuals with inefficient respiratory function at sea level are predisposed to failure at higher altitudes. Altitude training results in increased respiratory volume and decreased respiratory rate without changes in the minute volume. Cheyne-Stokes rhythm is also encountered at altitude, probably because of changes in the acid-base balance.

6847

Rankin, J.,

R. S. McNeill, and R. E. Forster

INFLUENCE OF HYPERCAPNIA ON PULMONARY DIFFUSING CAPACITY FOR CO IN MAN [Abstract].—Physiologist, 1 (1): 68-69. Nov. 1957. DNLM

Measurement was made of the pulmonary diffusing capacity for carbon monoxide (D_L) during hypercapnia in 8 resting normal subjects by the carbon monoxide-helium breath-holding technique. When 10% carbon dioxide (CO_2) was added to the inspired gas mixture used in the measurement of D_L , D_L was increased an average of 5% and 12% after 10 and 50 seconds of breath holding, respectively. Pulmonary capillary blood volume (V_c) measured in two subjects was increased approximately 11%. After the subject breathed a gas mixture containing 7.5% CO_2 for 10 minutes, D_L was increased an average of 24% in all subjects, and V_c was increased an average of 60% in the two subjects studied. In 5 subjects repeated measurements of D_L , ventilatory rate, systemic blood pressure, pulse rate and pulmonary blood flow were made before, during and after the period of hypercapnia. After starting to breathe the CO_2 -enriched gas mixture, D_L rose abruptly, reaching near maximal values in 2-5 minutes, while the other measurements of respiratory and circulatory phenomena continued to rise for 6-10 minutes, suggesting that the presumed increase in the pulmonary capillary bed was not directly dependent on the respiratory and circulatory changes. (Authors' abstract, modified)

6848

Schaub, F.,

A. Bühlmann, and H. Behn
[ELECTROLYTE AND ELECTROCARDIOGRAM CHANGES IN HYPERVENTILATION] Elektrolyt- und EKG-Veränderungen bei Hyperventilationen.—*Cardiologia (Basel)*, 31 (4): 289-295. 1957. In German.

DNLM

Eight healthy subjects were intensively hyperventilated for a minimum of 10 min. while under continuous observation of blood electrolytes, blood gases, pH, electrocardiogram, and blood pressure. A pronounced hypopotassemia which outlasted the hyperventilation developed in association with severe respiratory alkalosis. Sodium, calcium, and chlorides were maintained within the normal range. Blood pressure dropped slightly. No relationship could be recognized between the so-called hyperventilation electrocardiogram and the humoral changes, particularly the hypopotassemia.

6849

Sénelar, R.

and [P.] Bouverot

[HYPEROXIA: PHYSIO- AND ANATOMO-PATHOLOGICAL ASPECTS] L'hyperoxie: aspects physio et anatomo-pathologiques.—*Archives de biologie thermo-climatique (Paris)*, 2 (4). [Reprint, 10 p.] 1957.

A review is presented of various aspects of hyperoxia. Included are (1) the length of exposure to partial pressure of oxygen; (2) physio-pathology, including respiratory, cardio-pulmonary, circulatory, and psychological effects; (3) syndrome of carbon intoxication; (4) anatomical pathologic studies; and (5) interpretation of the pathogenic mechanisms.

6850

Shephard, R. J.

CHANGES OF INTRAMUSCULAR BLOOD FLOW DURING CONTINUOUS HIGH PRESSURE BREATHING.—*Jour. Aviation Med.*, 28 (2): 142-153. April 1957.

DLC (RC1050.A36, v. 28)

The intramuscular blood flow in five male subjects was measured indirectly by recording intramuscular temperatures with needle thermocouples inserted in

the left brachio-radialis muscle. During pressure breathing with thoracic counterpressure, there is a considerable initial peak of intramuscular temperature, suggesting a marked increase of muscle blood flow. It is difficult to attribute this entirely to the increased blood-pressure gradient throughout the limb; it may indicate that an increase of vascular diameter is produced by the raised transmural pressure. With continued pressure breathing, this phase is succeeded by a phase of rapid cooling, suggesting that peripheral flow is now decreased. This reversal despite a persistently increased transmural pressure suggests an increase of peripheral vascular tone, and possible mechanisms are discussed. (Author's summary, modified.)

6851

Shephard, R. J.

ELECTROCARDIOGRAPHIC CHANGES DURING PRESSURE BREATHING.—*Brit. Heart Jour. (London)*, 19 (2): 243-252. April 1957.

DNLM

Same as item no. 5359, vol. V.

6852

Sunahara, F. A.,

F. Girling, R. A. Snyder, and D. Topliff
STUDIES IN HYPERVENTILATION AT GROUND LEVEL AND AT SIMULATED ALTITUDE.—*Jour. Aviation Med.*, 28 (1): 13-18. Feb. 1957.

DLC (RC1050.A36, v. 28)

This report is a comparative study of alveolar pCO_2 depression at ground level and at a simulated altitude of 25,000 ft. Adult male subjects attempted to hyperventilate breathing 100% oxygen at ground level and at altitude. Exhaled CO_2 was constantly monitored to record respiratory fluctuations of pCO_2 . Hyperventilation at altitude is found to be no more effective in depressing pCO_2 than comparable hyperventilation at ground level.

6853

Ting, E.,

S. K. Hong, and H. Rahn

CARDIO-PULMONARY RESPONSES TO NEGATIVE PRESSURE BREATHING IN MAN [Abstract].—*Physiologist*, 1 (1): 83-84. Nov. 1957.

DNLM

Cardiovascular adjustments and pulmonary mechanics were studied on subjects continuously breathing into a large box, the pressure of which was maintained at 20-30 cm. H₂O below atmospheric pressure (negative pressure breathing). The vital capacity was reduced to 80% and the expiratory reserve volume to 26%. The minute volume increased approximately 50% due to an increase in breathing frequency. The airway resistance was almost doubled at a flow rate of 1 liter/second, while the lung compliance was reduced to 50%. Both systolic and diastolic pressure and heart rate were not altered significantly. Finger plethysmography provided evidence for peripheral vasoconstriction. Thus, the heart, pulmonary vessels, and intrathoracic veins were exposed to greatly decreased pressures. However, the peripheral venous pressure changed little, due to a collapse of veins entering the thoracic cage. It is proposed that this venous collapse serves as defense mechanism for maintaining normal peripheral circulation pressures and preventing pulmonary congestion. The extra strain on the circulation is placed on the left heart which has to overcome the induced negative pressure. (From the authors' abstract)

6854

Wayne, H. H.

A CLINICAL COMPARISON OF THE SYMPTOMS OF HYPOXIA AND HYPERVENTILATION.—School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 57-128, Sept. 1957. 8 p. AD 153 817

PB 134 874

A total of 165 to 183 subjects approximately half of whom were medical officers was exposed to hypoxia at 25,000 feet and hyperventilation at ground level. Each subject had as an end point muscular incoordination as evidenced by illegibility of the handwriting. Symptoms were recorded in all cases. Tabulation of frequency of symptoms revealed that it was not possible on clinical grounds to differentiate between these two conditions. It is clear that the symptoms of hypoxia are similar to those of hyperventilation since hyperventilation invariably accompanies any significant degree of hypoxia. Recommendations are presented which will help the pilot having symptoms at altitude to take the proper corrective action even though he may not be immediately aware of whether he is hypoxic or hyperventilating. (Author's abstract)

d. Metabolism

6855

Beickert, A.,

C. Mannstadt, and E. Klupsch
[EXPERIMENTS WITH ANIMALS ON THE EFFECT OF PHYSICAL TRAINING ON BASAL METABOLISM]
Tierexperimentelle Untersuchungen über die Beeinflussung des Grundumsatzes durch körperliches Training.—Zeitschrift für die gesamte experimentelle Medizin (Berlin), 129 (1): 60-68. 1957. In German. DNLM

Investigations of the basal metabolism of rats before and after intensive physical training (swimming) revealed, that: (1) the basal metabolism values are as a rule lowered after physical training as compared to initial values, in some cases as much as 30%; the mean decrease for all animals was 14.5%; (2) the decrease in metabolism is persistent and is based on a trophotropic shift in the autonomic nervous system. Certain conclusions are drawn in regard to the circulatory function in athletes and cardiac patients. (Authors' summary, modified)

6856

Buskirk, E. R.,

P. F. Iampietro, and B. E. Welch
VARIATIONS IN RESTING METABOLISM WITH CHANGES IN FOOD, EXERCISE AND CLIMATE.—Metabolism, 6 (3): 144-153. March 1957.

DLC (R850.M38, v. 6)

Essentially the same issued as report: Quartermaster Research and Development Center, Environmental Protection Research Division, Natick, Mass. (Project no. 7-83-01-004C). Technical Report no. EP-59, May 1957. iv+19 p. AD 135 303

UNCLASSIFIED

Resting oxygen consumption was used to measure the effect of exercise and food on resting metabolism and the impact of the environment on the daily pattern of metabolism. Diet was strictly controlled, moderate exercise was performed, and various climatic conditions were tested. Climate did not influence basal oxygen consumption with the exception that after 2000 hours in the hot-dry climate the resting oxygen consumption was significantly higher than in other

climates for the same time period. Specific dynamic action of food was the major factor in the diurnal elevation of the resting oxygen consumption, while moderate exercise alone had no effect. During fasting with or without exercise there was a significant diurnal elevation of the resting oxygen consumption. The peak oxygen consumption after food intake was 1.5-2.0 times the basal oxygen consumption, and it is cautioned that when the total oxygen is used as a measure of energy expenditure for work, variations will result unless recordings are made under controlled conditions with respect to food intake and time after meals. (36 references)

6857

Franck, C.

M. Lamarche, P. Arnould, and J. M. Demange
[EFFECT OF HYPEROXIA ON THE LEVEL OF HISTAMINE IN THE BLOOD AND PULMONARY TISSUE OF THE UNANESTHETIZED GUINEA PIG]
Action de l'hyperoxie sur le taux d'histamine dans le sang et le tissu pulmonaire du cobaye non anesthésié.—Journal de physiologie (Paris), 49 (1): 176-177. Jan.-March 1957. In French. DNLM

Twenty guinea pigs exposed to a hyperoxic atmosphere (95% oxygen) for six hours had no significant modification of the histamine level in total blood. By contrast, the level of histamine in the pulmonary tissue was significantly higher.

6858

Mefferd, R. B.,

and H. B. Hale

EFFECTS OF ALTITUDE, COLD, AND HEAT ON METABOLIC INTERRELATIONSHIPS IN RATS.—School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 57-141, Aug. 1957. 10 p. AD 149 556 PB 132 774

Adult male Wistar rats were exposed for three months either to simulated altitude or to hot or cold environments, and comparisons were made during the final month. These included body weight, food and water intake, and the 24-hour fasting urine volume and the excretion of sodium, potassium, phosphate, magnesium, calcium, urea, uric acid, creatinine, taurine, histidine, glycine, alanine, valine, aspartic acid, glutamic acid, methionine, and serine. Correlational analyses showed that many of the above-listed variables remained constant in the different environments regardless of the extent of quantitative changes. Intergroup changes in the variable-relationships noted in certain of these environments may indicate either an incomplete acclimatization or an environmentally specific adaptation. (Authors' abstract)

6859

Welch, B. E.

R. P. Riendeau, C. E. Crisp, and R. S. Isenstein
RELATIONSHIP OF MAXIMAL OXYGEN CONSUMPTION TO VARIOUS COMPONENTS OF BODY COMPOSITION.—Fitzsimons Army Hospital. Army Medical Nutrition Lab., Denver, Colo. (Project no. 6-60-11-020, USAMNL Subproject no. 7-3). Report no. 208, July 23, 1957. 4-8 p. AD 141 999

UNCLASSIFIED

The relationship was studied of maximal oxygen consumption to body weight, body fat, and body weight minus body fat and bone. The circulatory system appeared to be the major limiting factor in maximal oxygen consumption. Body weight, body weight minus body fat, and body weight minus body fat and bone weight accounted for only 35%, 41% and 41% respec-

tively, of the variability in maximal oxygen consumption. Maximal oxygen consumption expressed in cc./min./kg. body weight was significantly affected by the percent of body fat; however, when expressed as liters/min. or cc./min./kg. of fat-free weight, it was not significantly affected by the percent of body fat. (Authors' abstract)

e. Body Temperature

[Hibernation under 2-d]

6860

Arnoljčević, V.
[ELECTROCARDIOGRAPHIC MODIFICATIONS DURING DEEP HYPOTHERMIA] Modifications de l'électrocardiogramme au cours de l'hypothermie profonde.—*Cardiologia (Basel)*, 31 (5): 420-425. 1957. In French, with English summary (p. 425). DNLN

Electrocardiographic investigations of hypothermic rats with a rectal temperature of 12°-14°C. show that low temperatures mainly affects impulse formation and conduction, whereas the effect on depolarization and repolarization of the ventricles is less pronounced. Increases are demonstrated in the QRS wave, with a decrease of the amplitude of the T wave, which disappears at 14° C.

6861

Aschoff, J.
[HEAT EXCHANGE IN A MODEL OF AN EXTREMITY] Wärmeaustausch in einer Modell Extremität.—*Pflügers Archiv für die gesamte Physiologie (Berlin)*, 264 (3): 260-271. 1957. In German. DLC (QP1.A63, v. 264)

Experiments on heat exchange of extremities were conducted with a glass and copper model of the human arm including the hand, with the heat furnished by a constant flow of water through it. Arterio-venous heat exchange, heat loss from the arm and hand, as well as the cooling of the arterial blood and the rewarming of the venous blood in the arm depend in a highly complex manner upon the velocity of the blood stream. Heat exchange values which were calculated from the heat lost by the hand and the fall in temperature between the water flowing into the arm (core temperature) and the water in the calorimeter (skin temperature), are directly proportional to the pressure of the water flow. The relationship between heat exchange values and the flow pressure remains constant under varying conditions of heat exchange.

6862

Beavers, W. R.,
and B. G. Covino
ANTIFIBRILLARY EFFECTS OF GLYCINE IN HYPOTHERMIA (Abstract).—*Federation Proceedings*, 16 (1, part I): 281. March 1957. DLC (QH301.F37, v. 16)

Twenty-four out of 25 anesthetized dogs, unacclimatized to cold and subjected to immersion hypothermia, succumbed to ventricular fibrillation at a rectal temperature of 23.5-14.5° C. Ten unacclimatized dogs treated with intravenous glycine terminated in asystole at a rectal temperature of 18.5-15° C., without exhibiting cardiac arrhythmias. (Authors' abstract, modified)

6863

Billewicz-Stankiewicz, J.,
and D. Górny
[THE EFFECT OF HYPERTHERMIA ON INTEROCEPTIVE REFLEXES] Wpływ hipertermii na odruchy interoceptyjne.—*Acta physiologica polonica (Warszawa)*, 8 (3-3a): 285. 1957. In Polish. DLC (QP1.A27, v. 8)

Hypertemia induced in 115 anesthetized dogs caused decreases of the carotid sinus, gall bladder, and urinary bladder reflexes and of the hypotensive vagal and epinephrine effects. Depressor reflexes induced by stimulation of the gastric mechanoreceptors or by rectal dilatation were slightly increased in hypertemia. Hypertemia applied to the head of one dog and to the body of another, decreased gastric and rectal depressor responses in 2 parabiotic dogs.

6864

Bober, S.,
J. Nielubowicz, M. Justyna, I. Krzemińska-Zawkowiczowa, and B. Marzinek
[BEHAVIOR OF BLOOD ELECTROLYTES IN EXPERIMENTAL HYPOTHERMIA IN DOGS. IV.] Zachowanie się elektrolitów krwi w hipotermii doświadczalnej u psów. IV.—*Polski tygodnik lekarski (Warszawa)*, 12 (17): 627-631. April 22, 1957. In Polish, with English summary (p. 631). DNLN

Dogs were cooled to body temperatures between 31° and 28° C. and then to temperatures between 24° and 20° C. Examination of blood electrolytes in these animals revealed that (1) the chloride level after an initial insignificant increase was actually decreasing; (2) the sodium and potassium level decreased slightly; and (3) the calcium level increased in proportion with the rate of body cooling. (Authors' summary, modified)

6865

Bober, S.,
J. Nielubowicz, M. Justyna, I. Krzemińska-Zawkowiczowa, and B. Marzinek
[BEHAVIOR OF PLASMA PROTEINS IN EXPERIMENTAL HYPOTHERMIA IN DOGS] Zachowanie się białek osocza w hipotermii doświadczalnej u psa.—*Polski tygodnik lekarski (Warszawa)*, 12 (15): 543-545. April 8, 1957. In Polish, with English summary (p. 545). DNLN

Plasma proteins and albumins were observed to increase slightly in hypothermic dogs with a body temperature of 28° C., but to decrease at a temperature of 20° C. These differences were not statistically significant. The important changes concerned the alpha and beta globulins which increased with body cooling. Gamma globulins decreased accordingly. (Authors' summary, modified)

6866

Bober, S.,
J. Nielubowicz, M. Justyna, I. Krzemińska-Zawkowiczowa, B. Marzinek
[ELECTROCARDIOGRAPHIC CHANGES IN EXPERIMENTAL HYPOTHERMIA OF DOGS] Zmiany elektrokardiograficzne w doświadczalnej hipotermii u psów.—*Polski tygodnik lekarski (Warszawa)*, 12 (1): 1-7. Jan. 1, 1957. In Polish, with English summary (p. 7). DNLN

Electrocardiographic changes observed in 34 dogs were found to depend on the effect of temperature on the circulatory system and especially on the cardiac

muscle. With the decrease in body temperature, the cardiac frequency also decreased. This decrease was not parallel to the degree of cooling and behaved differently in different dogs. The time of electrical stimulation of the ventricles gradually lengthened. This lengthening was greater than expected. Auricular deflections increased at first, but became smaller, wider, and divided upon further cooling. The PQ(PR) section gradually increased as well as the duration of the QRS syndrome. Changes were also found in the ST-T syndrome, J point, and ST section. (Authors' summary, modified)

6867

Bok, S. T.,
and J. P. Schade
HYPOTHERMIA AND CEREBRAL ACTIVITY.—*Acta physiologica et pharmacologica neerlandica* (Amsterdam), 6: 775-794, 1957. In English. DNLM

The relationship between hypothermia and cerebral activity was investigated in rats by electrocorticography. At approximately 31° C. body temperature, there is a difference in the ratio between the number of vibrations per second and their amplitude. Between 37° and 31° C., there is a decrease of frequency accompanied by an increase of amplitude; from about 31° to 18° C. both the frequency and amplitude decrease. Attention is drawn to the possible determination of a "critical point", below which hypothermia should not be extended. (Authors' summary, modified)

6868

Cherviakovskii, N. IA.
[THE EFFECT OF GENERAL HYPOTHERMIA AND COLD-AIR BREATHING ON THE RESPIRATORY TRACT AND LUNGS] *Vlianie obshchego pereokhlazhdenia i vdykhania kholodnogo vozdukh na dykhatel'nye puti i legkie.* — *Voenno-meditsinskiy zhurnal* (Moskva), 1957 (1): 35-37. Jan. 1957. In Russian. DLC (RC970.V55, v. 1957)

Rats were placed in a cold chamber (-50° C.) for 30 minutes to 2 hours. Thirteen of the 15 animals survived the exposure, but 9 of them died within two days. The remaining four were sacrificed and studied 5 days after the experiment. Rapid warming of the animals did not accelerate their respiration until they had resumed their normal activity. It is believed that the respiratory changes in hypothermia are of a reflex nature and also caused by the anesthetic effect of cold air. Microscopic examination of trachea and bronchi of the survivors showed no epithelial changes; the lungs were hyperemic, atelectatic, and emphysematous.

6869

Covino, B. G.,
and W. R. Beavers
CARDIOVASCULAR RESPONSE OF COLD ACCLIMATIZED DOGS TO IMMERSION HYPOTHERMIA [Abstract]. — *Federation Proceedings*, 16 (1, part 1): 28, March 1957. DLC (QH301.F37, v. 16)

Adult mongrel dogs were anesthetized with pentobarbital and cooled to terminus in a cold water bath of 5° C. The control series included 25 dogs who were exposed to an environment of 15.5°-29.4° C. Twenty-four dogs (96%) in this group succumbed to ventricular fibrillation at an average rectal temperature of 18.0° C. A second group of 6 animals were exposed to an environmental temperature of -45°-0° C. for a period of four weeks and then rendered hypothermic. All

6 dogs terminated in asystole at an average rectal temperature of 14.6° C. without exhibiting any cardiac arrhythmias. Five additional dogs were exposed to an environmental temperature of -45°-20° C. for one week and then cooled. Four of the 5 dogs (80%) fibrillated at a rectal temperature of 15.0° C. The results indicate that dogs exposed for prolonged periods to a low environmental temperature are more resistant to hypothermic ventricular fibrillation. Brief exposure periods do not decrease the incidence of fibrillation but do lower the temperature at which this cardiac abnormality occurs. (Authors' abstract, modified)

6870

Covino, B. G.,
and W. R. Beavers
HIND LIMB BLOOD FLOW DURING IMMERSION HYPOTHERMIA.—*Arctic Aeromedical Lab., Ladd Air Force Base, Alaska* (Project no. 8-7954). Report no. 2, Jan. 1957. 13 p. UNCLASSIFIED
Also published in: *Jour. Applied Physiol.*, 10 (1): 146-150, Jan. 1957. DLC (QP1.J72, v. 10)

A marked vasodilatation was observed in the hind limb of dogs subjected to immersion hypothermia. An initial dilatation occurred at a rectal temperature of 35° C., while a second dilatation took place at a rectal temperature of 28-25° C. The primary response appeared due to the stimulation of sympathetic cholinergic dilator fibers supplying arterio-venous anastomotic vessels in skeletal muscle. This response could be inhibited by atropinization and/or sympathectomy-adrenalectomy. The secondary dilatation was unrelated to nervous or local metabolic factors. This phenomenon was correlated with an extremely low muscle and blood temperature, and so is believed due to the direct influence of cold on the skeletal muscle arteriolar-capillary circuit. (Authors' summary and conclusions)

6871

Czarnecki, E.,
and Z. Jendykiewicz
[HYPOTHERMIA AND EXPERIMENTAL SHOCK] *Hipotermia a wstrzas doświadczalny.* — *Acta physiologica polonica* (Warszawa), 8 (3-3a): 304-307, 1957. In Polish. DLC (QP1.A27, v. 8)

Hypothermia (5-14° C.) prevented anaphylactic shock in 19 of 20 guinea pigs, histamine-induced shock in 17 of 20 guinea pigs, and peptone-induced shock in 13 of 20 guinea pigs.

6872

Di Giorgio, A. M.
[RESPIRATORY REFLEXES IN HYPOTHERMIA: REACTIONS OF TRIGEMINAL THERMORECEPTORS AND MECHANORECEPTORS] *Riflessi respiratori nella ipotermia: reazioni da termorecettori e da meccanorecettori trigeminali.* — *Archivio di fisiologia* (Firenze), 57 (2-3): 148-181, Nov. 12, 1957. In Italian, with English summary (p. 178-179). DNLM

Reflexes of the respiratory tract of trigeminal origin produced by mechanoreceptors of the nasal mucosa and by thermal receptors of the perinasal and labial skin were studied in unanesthetized hypothermic guinea pigs. Critical extinction temperature or reactions produced by mechanoreceptors were different, the sneeze reflex being abolished at a body temperature of about 27° C., and the unilateral nostril expansion reflex at 20° C. Reflexes from thermoreceptors produced by stimulating the nasal skin with water at different temperatures were elicited up to a

body temperature of 24° C. At temperatures lower than 24°, the first to be extinguished was the reaction to warmth, at about 23° C, the dorsal flexion reflex, and at 22° C. apnea occurred. The gradual decrease of respiratory activity in hypothermia seems to originate from the progressive extinction of various reflexes: the spontaneous respiration occurring at the greatest degree of hypothermia is the expression of autochthonous activity of the bulbar respiratory center. (Author's summary, modified) (49 references)

6873

Donhotter, S.,

G. Szegvári, I. Varga-Nagy, and I. Járai
[ON THE LOCALIZATION OF THE INCREASED
HEAT PRODUCTION IN CHEMICAL THERMOREGULATION] Über die Lokalisation der erhöhten Wärmeproduktion bei der chemischen Wärmeregulation.—
Pflügers Archiv für die gesamte Physiologie (Berlin),
265 (2): 104-111. 1957. In German.

DLC (QP1.A63, v. 265)

At low environmental temperatures the intestinal and liver temperature of rats rises synchronous with the onset of waves of increased heat production. At the cessation of the heightened heat production there is an immediate fall of the intestinal temperature while the muscle temperature remains unchanged or is even rising. The fall in muscular temperature takes place later. These findings are interpreted in support of the existence of a chemical thermoregulation. The musculature is neither the only source nor in this case the dominant source of increased heat production. (From the authors' summary)

6874

Fedor, E. J.,

1957

C. Russ, S. H. Lee, and B. Fisher
REWARMING FOLLOWING PROLONGED HYPOTHERMIA [Abstract].— Federation Proceedings,
16 (1, part 1): 36. March 1957.

DLC (QH301.F37, v. 16)

In animals maintained at 23° C. for eight hours and then rewarmed there was a prompt return to normothermic pre-cooled levels of venous pressure, pulse rate, clotting time, blood pH, plasma specific gravity, blood sugar, serum sodium and calcium. Blood pressure and prothrombin time lagged. Hematocrit promptly returned to and fell below the pre-cooled value and serum potassium showed an increase. Following 12 hours of cooling the return to normal was not as prompt and mortality rate was approximately 50%. Observations on cardiac output indicate that even after many hours of rewarming following hypothermia there is a failure in the return of the cardiac index to normal pre-cooled levels while oxygen consumption rapidly becomes normal. (Authors' abstract, modified)

6875

Fisher, B.,

C. Russ, and E. J. Fedor
EFFECT OF HYPOTHERMIA OF 2 TO 24 HOURS
ON OXYGEN CONSUMPTION AND CARDIAC OUTPUT IN THE DOG.— Amer. Jour. Physiol., 188
(3): 473-476. March 1957. DLC (QP1.A5, v. 188)

The changes occurring in cardiac output and oxygen consumption in short periods of hypothermia are the same when either ether or pentobarbital sodium is used as the anesthetic agent during the

induction of hypothermia. Following an initial decrease in oxygen consumption, no further change occurred as long as the body temperature was maintained at a constant level. Cardiac output, arterial-venous oxygen difference, and coefficient of oxygen utilization remained unchanged for longer periods of time than most physiologic parameters studied during prolonged hypothermia at constant temperatures. After about 14 hours they also began to alter so that by 24 hours the changes are profound. Stagnant anoxemia and marked increase in the coefficient of O₂ utilization resulting from the markedly lowered cardiac output, which was 8% of the pre-cooled controls, occurred. (Authors' abstract)

6876

Froese, G.,

and A. C. Burton

HEAT LOSSES FROM THE HUMAN HEAD.— Jour.
Applied Physiol., 10 (2): 235-241. March 1957.

DLC (QP1.J72, v. 10)

Using calorimetry the nonevaporative heat loss was measured from the unprotected heads of three subjects who were adequately clothed otherwise. At temperatures between 32° C. and -21° C. the heat loss was linearly related to the external temperature by a regression equation. At -4° C. the heat loss may amount to half of the total resting heat production of the individual. The insulation of the tissues of the head did not change with the external temperature. To see if it would change if there was general vasodilatation or vasoconstriction, another series of tests were made: (a) at 10° C. with the subject unclothed, (b) at 20° C. with the subject clothed, and (c) at 29° C. with the subject clothed and a heating pad on the chest. While the tissue insulation of the finger increased by a factor of six in (a) as compared with (b), that of the head was constant. In (c) the tissue insulation of the head decreased slightly, indicating slight vasodilatation. The importance of insulation of the head in the cold is to extend the tolerance time as pointed out by practical examples. (Authors' abstract, modified).

6877

Hołobut, W.,

and W. Stańska

[THE EFFECT OF ARTIFICIAL HYPOTHERMIA ON
SOME HEMODYNAMIC PHENOMENA] Wpływ sztucznej
hipotermii na niektóre zjawiska hemodynamiczne
— Acta physiologica polonica (Warszawa), 8 (3-3a):
356-357. 1957. In Polish. DLC (QP1.A27, v. 3)

In anesthetized, heparinized dogs, hypothermia decreased the heart rate and produced premature systoles at a body temperature of about 27° C. Below 29° C. the arterial blood flow and the diastolic pressure decreased and the systolic pressure increased. Venous pressure and flow progressively decreased with the increase of hypothermia. The blood vessels are constricted in the early phases of hypothermia but adapt themselves to deep hypothermia and do not obstruct the cardiac blood supply being in a condition of decreased resistance.

6878

Hsieh, A. C. L.,

1957

and L. D. Carlson

ROLE OF SYMPATHETIC NERVOUS SYSTEM IN
CHEMICAL REGULATION OF HEAT PRODUCTION

TRON [Abstract]. — Federation Proceedings, 16 (1, part 1): 62-63, March 1957.

DLC (QH301.F37, v. 16)

When muscle activity is blocked by curare, only cold-adapted rats can increase heat production sufficiently to maintain body temperature when a test room is cooled from 30° to 5° C. The role of the sympathetic nervous system in this response was tested with injections of adrenaline and noradrenaline and of sympatholytic and autonomic blocking drugs. The calorogenic effect of adrenaline is enhanced in cold-adapted animals, and noradrenaline, which has little calorogenic effect in the warm-adapted animal, has a marked effect in cold-exposed animals. The ganglionic blocking agent hexamethonium chloride and the adrenolytic agent piperazine hydrochloride prevented the increase in oxygen consumption otherwise observed in curarized, cold-adapted rats exposed to cold. (Authors' abstract)

6879

Hügin, F.,
and V. Verzár

[FAILURE OF THERMOREGULATION IN OLDER ANIMALS] Versagen der Wärmeregulation bei alten Tieren. — Gerontologia (Basel), 1 (2): 91-106, 1957. In German, with English summary (p. 106). DNLN

The rectal temperature of rats decreases with age according to measurements made on 96 male animals, 3-28 months old. 230 male rats, 3-31 months old, were kept at low temperatures of from -0.5° to 14° C. for one hour. With increasing age, the body temperature showed a greater decrease. With 96 male rats of 3 to 28 months, it was tested whether they maintain their rectal temperature when kept at a temperature of 38° C. Young animals showed less increase than old ones. Neither cooling nor warming experiments showed a correlation to body weight. It was concluded that the central mechanism of heat regulation is disturbed in the old animal and the ability for adaptation is less. (Authors' summary)

6880

Hunter, J.

REANIMATION OF RATS AFTER CARDIAC AND RESPIRATORY ARREST DUE TO LOW BODY TEMPERATURE. — Canad. Jour. Biochem. and Physiol. (Ottawa), 35 (8): 605-613, Aug. 1957.

DLC (R11.C37, v. 35)

Rats were enclosed in a sealed vessel, cooled to rectal temperatures of 2-3° C., and maintained at this temperature for various periods up to one hour without cardiac or respiratory activity. The accumulation of metabolic CO₂ within the sealed vessel seemed to be an important factor in the success of subsequent reanimation. Rapid rewarming appears to be advantageous, but artificial ventilation is imperative during rewarming if the animals are to recover. About 65% of the artificially ventilated animals survived.

6881

Jude, J. R.,

L. M. Haroutunian, and R. Folse
HYPOTHERMIC MYOCARDIAL OXYGENATION. — Johns Hopkins Univ. School of Medicine, Baltimore, Md.; issued by School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 57-13, May 1957. 12 p. AD 142 527 PB 130 072

With careful control of ventilation so as to maintain the arterial blood pH at 7.45 to 7.56 the coronary

blood flow was determined by the nitrous oxide technique in 11 dogs at 36° to 38° C. and 9 at 20° to 31° C. Coronary blood flow decreased an average of 71% while the coronary arteriovenous difference also decreased. Left ventricular myocardial oxygen consumption decreased relatively less than the measurable work of the heart, resulting in a decrease of the mechanical efficiency of the left ventricle. It is concluded that the oxygen supply to the left ventricular myocardium is sufficient under hypothermic conditions as low as 20° C. (Authors' abstract) (24 references)

6882

Kayser, C.

PHYSIOLOGICAL ASPECTS OF HYPOTHERMIA. — Ann. Rev. Physiol., 19: 83-120, 1957.

DLC (QP1.A535, v. 19)

This review includes a survey of the literature on the subject received in Strasbourg, France, to June 1, 1956. In addition to defining hypothermia the review includes physiologic and accidental hypothermia; general reviews related to clinical uses of hypothermia; methods of producing hypothermia; hypothermia and oxygen intake; the lethal temperature of homeotherms in hypothermia; respiration and body fluids in hypothermia; hypothermia and the nervous system, endocrine glands, and kidney function; and artificial hibernation or moderate pharmacological hypothermia. (62 references)

6883

Kiedrzyński, Z.

1957

and J. Venulet

[NEW METHOD FOR MEASURING THE LOSS OF HEAT] Nowa metoda pomiaru utraty ciepła. — Acta physiologica polonica (Warszawa), 8 (3-3^a): 377-378, 1957. In Polish. DLC (QP1.A27, v. 8)

The proposed simple apparatus to measure and evaluate vasomotor functions, and loss of heat, can be applied to any segment of the body under various physiological or pharmacological conditions and record measurements on a galvanometer or a kymograph.

6884

Kiersz, J.,

1957

W. Krajewski, and T. Zmorski

[THE EFFECT OF RESERPINE ON THE BODY TEMPERATURE] Wpływ reserpiny na ciepłotę ustroju. — Acta physiologica polonica (Warszawa), 8 (3-3^a): 379-380, 1957. In Polish.

DLC (QP1.A27, v. 8)

Reserpine administered intravenously to non-anesthetized dogs and rabbits at surrounding temperatures below 18° C. decreases their body temperatures; i.e., at 16° C. in rabbits by 0.4-2.7° C. and in dogs by 0.5-1.8° C. At 26° C. the temperature decreases by 6.5-1.4° C. in rabbits, and at 23° C. by 0.7-1.8° C. in dogs. If administered to anesthetized animals, or at temperatures below 14° C. it is more effective in decreasing body temperatures. Reserpine removes serotonin from the metabolism, and thereby from the thermoregulatory center in the hypothalamus, thus decreasing the animal's sensitivity to changes in the surrounding temperature.

6885

Korpáš, J.,

and Z. Tomori

[THE EFFECT OF HYPOTHERMIA ON COUGH AND

BREATHING] Vplyv hypotermie na kašel' a dýchanie. —Československá fyziologie (Praha), 6 (4): 479-482. Nov. 1957. In Slovak. DLC (QP1.C414, v. 6)

Twenty-eight mature cats were cooled in an ice water bath to body temperatures as low as 14° C. At 34-35° C. maximum amplitude of breathing and breathing frequency was reached. At this temperature amplitude had increased 30% and frequency 28%. Below 34° C. frequency began to decrease, but it was not until 32° C. that the amplitude started to decrease gradually. It appeared that amplitude of breathing was more resistant to cold. At 31°-14° C. breathing was frequently interrupted with deep gasping, and at 31°-19° C. during the respiratory pause there occurred spontaneous exhalations most likely due to muscle cramps. Decrease in breathing amplitude and frequency was probably caused by damage to the respiratory centers.

6886

Krawczak, J.,

L. Janiszewski, J. Narębski, and G. Olejarczuk [ELECTROENCEPHALOGRAPHIC AND VESTIBULAR CHRONAXY CHANGES IN RABBITS IN HYPOTHERMIA] Zmiany EEG oraz chronaksji przedsionkowej ucha u królików pod wpływem hipotermii. —Acta physiologica polonica (Warszawa), 8 (3-3a): 400-401. 1957. In Polish. DLC (QP1.A27, v. 8)

During the initial phase of hypothermia (body temperature around 27° C.) rabbits displayed the following symptoms: respiration became shallow and rapid, and the heart rate decreased. Further decreases of body temperature caused an increase in bradycardia and bradypnea, an increase that was reversible. As hypothermia increased, the amplitude of EEG recordings increased up to 3-5 times the normal values (at the minimum temperature). A decrease of vestibular chronaxy was observed in 11 of 16 rabbits, as manifested by the ocular and head bending reflexes. It was not always possible to induce nystagmus. In some animals all the reflexes became normal again after prolonged hypothermia and in all animals, upon the restoration of normal body temperature.

6887

Kryszewski, A.,

and J. Szafranek

[THE EFFECTS OF HYPOXIC-HYPERCAPNIC HYPOTHERMIA ON ERYTHROCYTE COUNT IN RATS] Wpływ hipotermii hipoksyczno-hiperkapnicznej na liczbę erytrocytów u szczurów. —Acta physiologica polonica (Warszawa), 8 (3-3a): 405. 1957. In Polish. DLC (QP1.A27, v. 8)

After 1-3 1/2 hours, a decrease in the red blood count (RBC) of about 10% was observed in rabbits cooled to below 25° C. A lesser degree of hypothermia was less effective in reducing the RBC.

6888

Kubicek, W. G.,

W. F. Geber, J. W. Geiger, and E. A. Johnson THE ROLE OF THE SPLANCHNIC AND LUMBAR SYMPATHETIC NERVES IN THE PHYSIOLOGIC RESPONSE TO FEVER AND HYPOXIA IN DOGS EITHER ANESTHETIZED OR UNANESTHETIZED. —Univ. of Minnesota Medical School, Minneapolis; issued by School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 56-66, June 1957. 54 p. AD 144 590 UNCLASSIFIED

The role of the splanchnic and lumbar sympathetic nerves in the physiologic response to fever and

hypoxia was studied. Blood chemistry and circulatory and metabolic studies were performed on two series of dogs, subjected to 41° and 43° C. fever rectal temperature, respectively. Each animal was subjected to four experiments: intact, anesthetized and unanesthetized; after sympathectomy, anesthetized and unanesthetized. Sympathectomy consisted of bilateral removal of the splanchnic and lumbar sympathetic nerves, which were important in circulatory control and in a partial control of blood glucose through the adrenal medulla. Differences between the two fever levels were most distinct in the anesthetized animals. Anesthesia resulted in a decreased muscular activity, lowered oxygen consumption rate, and blood chemistry alterations. (Authors' abstract)

6889

Kuhn, L. A.,

and J. K. Turner

ALTERATIONS IN PULMONARY AND PERIPHERAL VASCULAR RESISTANCE IN HYPOTHERMIA: THE EFFECTS OF SYMPATHOLYTIC AND SYMPATHOMIMETIC AGENTS ON THE COURSE OF IMERSION HYPOTHERMIA. —Army Medical Research Lab., Fort Knox, Ky. (USAMRL Project no. 6-64-12-028, Subtask S-13). Report no. 265, April 25, 1957. ii+41 p. AD 131 822 UNCLASSIFIED

Normal anesthetized dogs surviving hypothermia below a colonic temperature of 22° C. without ventricular fibrillation in general demonstrate at low body temperature a higher peripheral vascular resistance and a lower pulmonary vascular resistance than dogs which manifest ventricular fibrillation above 22° C. The sympathomimetic agent, nor-adrenalin, lowered the temperature to which dogs could be safely brought. The sympatholytic agent, dibenzylamine, acted deleteriously in that death in ventricular fibrillation occurred at higher body temperatures than in untreated dogs. The high pulmonary vascular resistance seen in hypothermia was associated with maintenance of a high degree of right ventricular work at low body temperatures, whereas the work of the left ventricle declined to a greater extent than that of the right. Cold-adaptation for two months did not protect against ventricular fibrillation in hypothermia. (Authors' results, modified) (68 references)

6890

Lemaire, R.,

and M. Boura

[MECHANISM OF EFFECTS OF HEAT ON VASOMOTOR REACTIONS FOLLOWING STIMULATION OF SINO-CAROTID REFLEXES] Mécanisme des effets de la chaleur sur les réactions vasomotrices consécutives à la stimulation des réflexes sino-carotidiens. —Journal de physiologie (Paris), 49 (1): 278-280. Jan.-March 1957. In French. DNL M

After 40 minutes of exposing a dog's paw to heat, local vasomotor reactions were totally decreased in relation to those obtained before heating. Under the effect of heat, vasomotor reactions following stimulation of the carotid sinus showed two changes: (1) at the beginning of the experiment, the reflexes were exaggerated possibly due to the peripheral distribution of the blood mass caused by cutaneous thermic vasodilation and the appearance of hyperexcitability of the central vasomotor structures; and (2) tension reactions were decreased, probably because the peripheral vasomotor organs were unable to respond to neurohumoral stimuli. This decrease in response intensity appears when the subcutaneous temperature reaches 41° C.

6891

Litwin, J.

[THE INFLUENCE OF HYPOTHERMIA ON PRESSOR AND DEPRESSOR EFFECTS OF EPINEPHRINE IN CATS] Wpływ hipotermii na presyjne i depresyjne działanie adrenaliny u kotów. — *Acta physiologica polonica* (Warszawa), 8 (3-3a): 423-424. 1957. In Polish. DLC (QP1.A27, v. 8)

As the degree of hypothermia increases the pressor effect of epinephrine decreases and can even be abolished. In the early stages of hypothermia (33-30° C.), the pressor effect may temporarily increase. As it decreases, the depression time becomes more prolonged, as was shown on anesthetized cats, some of which had been vagotomized. Temperatures of 32-27° C. and below 20° C. produced bradycardia, which was not blocked by vagotomy in deep hypothermia. Beginning with temperatures of 25-20° C., epinephrine (particularly in larger doses) produced a bi-phasic pressor effect in most cases: a short and acute increase in blood pressure followed by a decrease and mild increase, only to decrease again. Bilateral vagotomy did not abolish this reaction. The depressor effect of epinephrine usually was abolished when the body temperature reached 30-20° C., not necessarily because of decreased vagal excitation but possibly due to already existing hypotension. All changes induced were reversible as body temperature increased to normal values.

6892

Litwin, J.

[VASOMOTOR REFLEXES IN HYPOTHERMIC CATS] Zachowanie się odruchów naczynioruchowych u kotów w hipotermii. — *Acta physiologica polonica* (Warszawa), 8 (3-3a): 424-426. 1957. In Polish. DLC (QP1.A27, v. 8)

In its initial phase, hypothermia (32°-30° C.) increases bradycardia induced by severing the vagus nerve in anesthetized cats. When the body temperature reaches 20° C., the hypotensive vagal effect is totally abolished. Likewise, the pressor effect, induced by occlusion of the common arteries, increases in the early stages of hypothermia, but disappears at around 25°-23° C. Hypothermia affects similarly the pressor effects induced by splanchnic nerve stimulation. It may be concluded that hypothermia exerts a biphasic effect on cardiovascular reflexes: an initial increase is followed by a decrease and ultimate disappearance.

6893

Łopaciuk, S.,

and J. Panasewicz

[THE EFFECTS OF SHOCK-PRODUCING AGENTS AND DEEP PHYSICAL HYPOTHERMIA ON VENOUS CIRCULATION] Wpływ czynników wstrząsatorodnych oraz głębokiej hipotermii fizycznej na dynamikę krążenia żylnego. — *Acta physiologica polonica* (Warszawa), 8 (3-3a): 429-432. 1957. In Polish. DLC (QP1.A27, v. 8)

During the initial phases of hypothermia (34.5-24.5° C.), venous blood pressure increased proportionally to the arterial pressure increase in anesthetized cats. Cooling to 17° C. induced a decrease in venous pressure, again proportional to the arterial pressure decrease. Temperatures of 17°-11° C. often produced cardiac arrest and a drastic increase in venous pressure — a phenomenon similar to shock. Ordinarily temperatures below 16.5° C. produced a linear decrease in venous

pressure up to the point of inactivation of the respiratory and vasomotor centers (at around 12° C. and 9.5° C. respectively). Below 9.5° C. no further changes in venous pressure were observed.

6894

Lyman, C. P.

1957

TEMPERATURE, HEART RATE, AND OXYGEN CONSUMPTION DURING ENTRANCE INTO HIBERNATION [Abstract]. — *Federation Proceedings*, 16 (1, part I): 82-83. March 1957. DLC (QH301.F37, v. 16)

After entering hibernation, individual woodchucks (*Marmota monax*) were fitted with indwelling thermocouples and electrodes and placed in a metabolism chamber. When the animal started to hibernate, the heart rate and oxygen consumption invariably declined at least 10 minutes before any drop in body temperature occurred. During the slow decline in body temperature, the heart rate could vary as much as 100% at identical temperatures in the same animal entering hibernation at different times. During partial arousal, heart rate and oxygen consumption increased before any rise in body temperature. While entering hibernation, the heart was the warmest part of the body and the central portion of the peritoneal cavity was cooler. In the supine, nembutalized woodchuck, the heart and peritoneal area cooled together, but if the nembutalized animal was curled in the hibernating position, the heart cooled more slowly. (From the author's abstract)

6895

Lynch, H. F.,

and E. F. Adolph

BLOOD FLOW IN SMALL BLOOD VESSELS DURING DEEP HYPOTHERMIA. — *Jour. Applied Physiol.*, 11 (2): 192-196. Sept. 1957. DLC (QP1.J72, v. 11)

The minute blood vessels of rat mesocecum and hamster cheek pouch were examined before and during whole-body hypothermia or during local cooling. Blood ceased to flow in about half the observed vessels at 20° C. (rat) or 10°-5° C. (hamster). Arterioles, capillaries and venules did not change their mean calibers, hence vasoconstriction was not the rule. Linear velocity decreased in observed blood vessels. In hypothermia arterial blood pressure is known to remain high while pulse rate and cardiac output decrease greatly. Changes in blood viscosity account for nearly all the estimated increase of resistance, and narrowing of blood vessels in the tissues observed proves unimportant in upholding arterial pressure. (Authors' abstract)

6896

Maggi, G. C.,

R. B. Bevacqua, and S. Noli

[MODIFICATIONS OF THE ACID-BASE EQUILIBRIUM DURING ARTIFICIAL HYPOTHERMIA ON THE DOG] Modificazioni dell'equilibrio acido-base durante la ipotermia artificiale del cane. — *Archivio di fisiologia* (Firenze), 57 (4): 365-370. Dec. 12, 1957. In Italian, with English summary (p. 369). DNLM

Dogs cooled to rectal temperatures of 38°, 30°, and 20° C. exhibited, in connection with the depression of respiratory activity, a state of acidosis which could be reduced by hyperventilation.

6897

Marczak, K.

[THE EFFECT OF PHYSICAL HYPOTHERMIA AND CHLOROPROMAZINE ON THE RETICULO-ENDOTHELIAL SYSTEM IN RABBITS] Wpływ hipotermii fizycznej i chloropromazyny na czynność układu siateczkowo-śródbłonkowego królików. — *Acta physiologica polonica* (Warszawa), 8 (3-3a): 439-441. 1957. In Polish. DLC (QP1.A27, v. 8)

Absorption of Congo Red from the blood stream by the reticulo-endothelial system decreases in rabbits cooled to around 10.5° C., as compared with controls or with rabbits injected with chloropromazine. It is concluded that hypothermia reduces the activity of the reticulo-endothelial system.

6898

Markiewicz, L.,

and S. Ziemiański

[THE EFFECTS OF HYPOTHERMIA ON SOME CIRCULATORY PHENOMENA IN THE HOMOTHERMIC ORGANISM] Wpływ hipotermii na zachowanie się niektórych zjawisk krążeniowych ustroju stałocieplnego. — *Acta physiologica polonica* (Warszawa), 8 (3-3a): 442-444. 1957. In Polish. DLC (QP1.A27, v. 8)

Hypothermia causes decreases in the volume and rate of respiration of anesthetized cats. At around 21° C. all respiratory activity ceases. Blood pressure and cardiac minute volume decrease as the degree of hypothermia increases. Venous pressure increases during the initial phases of hypothermia and then, as the temperature is lowered, it also decreases. This decrease of venous pressure is, however, not considered responsible for atrial fibrillation occurring during hypothermia.

6899

Miętkiewski, E.,

A. Kamyżew, and J. Hurynowicz

[CHRONAXIMETRIC STUDIES OF THE LABYRINTH SYSTEM IN HYPOTHERMIC RABBITS] Badania chronaksymetryczne układu błędnikowego królików w sztucznej hipotermii. — *Acta physiologica polonica* (Warszawa), 8 (3-3a): 464-465. 1957. In Polish. DLC (QP1.A27, v. 8)

Short-duration hypothermia in anesthetized rabbits decreases the vestibular reflex activity, and increases the chronaxy of labyrinthine reflexes (ocular and head bending reflexes). The chronaxy of lacrimation, as a rule, cannot be determined in hypothermia. As cooling of the body continues, reflectory excitability of the vestibular apparatus increases, while ocular and head bending reflexes decrease. Gradual warming normalizes the chronaxy of vestibular reflexes; but even after two weeks values remain somewhat below normal.

6900

Miętkiewski, E.,

A. Kamyżew, and J. Hurynowicz

[CHRONAXIMETRIC STUDY OF THE LABYRINTHINE SYSTEM IN RABBITS IN ARTIFICIAL HIBERNATION] Badania chronaksymetryczne układu błędnikowego królików w sztucznej hibernacji. — *Acta physiologica polonica* (Warszawa), 8 (3-3a): 466-467. 1957. In Polish. DLC (QP1.A27, v. 8)

During and following drug-induced hypothermia, chronaximetric values of the vestibular reflexes varied in hibernating rabbits according to the type

and quantity of drugs used and the degree of hibernation. Largactyl, in doses nonlethal to normal animals, caused death in hypothermic animals (20° C. body temperature). Strabismus reflexes were easiest to detect, while nystagmus and head movements were less obvious. Hypothermia decreased the vestibular reflexes and increased the chronaxy of other reflexes in hibernating animals only when it was of short duration. Warming after hibernation made all chronaxy values return to normal. After two weeks labyrinthine excitability was observed to be increased.

6901

Miętkiewski, E.

[SENSITIVITY OF HYPOTHERMIC ANIMALS TO SHOCK-PRODUCING CHEMICALS] Wrażliwość zwierząt sztucznie oziębianych na działanie chemicznych czynników wstrząsowych. — *Acta physiologica polonica* (Warszawa), 8 (3-3a): 460-462. 1957. In Polish. DLC (QP1.A27, v. 8)

Hypothermia did not prevent anaphylactic shock in anesthetized dogs and guinea pigs, but decreased shock symptoms and increased the survival time of the animals. Histamine- or acetylcholine-induced shock was not ameliorated by hypothermia.

6902

Minard, D.,

1957

C. Kitzinger, and T. H. Bensinger

HUMAN HEAT LOSS DURING EXERCISE AT VARIOUS ENVIRONMENTAL TEMPERATURES [Abstract]. — *Federation Proceedings*, 16 (1, part 1): 88. March 1957. DLC (QH301.F37, v. 16)

Heat loss was recorded before, during, and after standard 40-minute exercises performed by each of two subjects at 5 calorimeter temperatures ranging from 29.5° to 21.1° C. At 29.5° C. evaporative heat loss rose steeply as work began, reaching a high plateau in 30 minutes. Radiative and convective heat loss contributed essentially nothing to the excess heat appearing during work and recovery. Total excess heat was 100 kcal. Thus in a cool environment heat produced during work is largely retained in the body and may serve to restore heat to tissues cooled during the preceding rest period. (Authors' abstract, modified)

6903

Möllerhoff-Mylius, I.

[CHANGES OF SPLEEN IN HYPOTHERMIC EXPERIMENTS] Milzveränderungen bei Unterkühlungsexperimenten. — *Zeitschrift für die gesamte experimentelle Medizin* (Berlin), 128 (5): 437-445. 1957. In German. DNLM

Hypothermia was induced in 70 male rats with a phenothiazin derivative (Megaphen) at an environmental temperature between 14-16° C. The animals' body temperature sank in a descending curve from 34° to 14° C. before death. Histological examination of the spleens showed: (1) regressive changes in the red pulp; decrease in the number of reticular cells and lymphocytes in spite of continued neogenesis of small lymphocytic forms; (2) transformation of the germinal center into reactive centers; (3) compensatory neogenesis of lymphocytes in the narrowed reticulocyte zones around the lymph follicles. The discussion compares these findings with observations of the spleens in hibernators and in animals with toxic damage to the spleen.

6904

Niasl, S. A.,

and F. J. Lewis

PROFOUND HYPOTHERMIA IN THE MONKEY WITH RECOVERY AFTER LONG PERIODS OF CARDIAC STANDSTILL.—*Jour. Applied Physiol.*, 10 (1): 137-138. Jan. 1957. DLC (QP1.J73, v. 10)

The body temperature of six adult Java monkeys was dropped by surface cooling to levels between 4° and 9° C. Cardiac standstill occurred when the body temperature reached 14°-11° C. and lasted for periods from 43 minutes to 123 minutes. All monkeys survived the procedure, and five lived for many months afterwards. The surviving monkeys appeared neurologically normal, and their behavior, intelligence and habits were unchanged. (Authors' abstract, modified)

6905

Niewiarowska, M.

[THE EFFECT OF PHYSICAL HYPOTHERMIA ON THE COAGULATION OF BLOOD AND FIBRINOLYSIS IN CATS] Wpływ hipotermii fizycznej na układ krzepnięcia krwi i fibrinolizy u kotów. — *Acta physiologica polonica* (Warszawa), 8 (4): 661-667. 1957. In Polish, with English summary (p. 666). DLC (QP1.A27, v. 8)

Blood coagulation was not affected by artificial cooling of cats to 0° C. Parallel to a decrease in the antiplasmin level of the plasma and euglobulin, there was a sharp increase in euglobulin fibrinolysis. The plasminogen level was not altered in hypothermia. It is probable that fibrinolysis of plasma euglobulin during hypothermia is due to a decrease in the antiplasmin level.

6906

Nowicka, H.,

Z. Bargiel, J. Narebski, L. Janiszewski, and J. Hurynowicz

[THE EFFECT OF SCHIZANDRA CHINENSIS ON THE VESTIBULAR CHRONAXY IN RABBITS AFTER HYPOTHERMIA] Wpływ *Schizandra chinensis* na chronaksję przedsionkowa królików po przebytej hipotermii. — *Acta physiologica polonica* (Warszawa), 8 (3-3a): 487-488. 1957. In Polish. DLC (QP1.A27, v. 8)

In vestibular reflexes (strabismus, head bending, and jerking of the eye), chronaxy decreased in 7 out of 12, increased in 3 out of 12, and not altered in 2 out of 12 rabbits, 2-8 months after hypothermia had been sustained, as compared to values obtained prior to and immediately after hypothermia. Oral administration of *Schizandra chinensis* tended to decrease chronaxy.

6907

Otis, A. B.,

and J. Jude

EFFECT OF BODY TEMPERATURE ON PULMONARY GAS EXCHANGE. — *Amer. Jour. Physiol.*, 188 (2): 355-359. Feb. 1957. DLC (QP1.A5, v. 188)

Measurements were made of the arterial-alveolar carbon dioxide gradient in anesthetized dogs at body temperatures ranging from normal down to 16° C. Pulmonary diffusing capacity was determined by a steady-state carbon monoxide method in anesthetized dogs at normal body temperatures and at 35° C. From the results it is concluded that although diffusing capacity is reduced at low body

temperatures, it is still adequate for transfer of both CO₂ and O₂ because the metabolic requirements for gas exchange are also reduced. (Authors' abstract)

6908

Panasewicz, J.,

and J. Pincel

[THE EFFECT OF PHYSICAL HYPOTHERMIA ON THE BLOOD CIRCULATION IN CATS] Wpływ hipotermii fizycznej na dynamikę krążenia krwi kotów. — *Acta physiologica polonica* (Warszawa), 8 (3-3a): 506-508. 1957. In Polish. DLC (QP1.A27, v. 8)

As the body temperature decreased in cats upon cooling, the blood pressure and heart rate increased while respiration decreased. In subsequent stages of hypothermia, these reactions diminished. Cooling of 15° C. below normal abolished the pressor reflexes ordinarily induced by carotid artery occlusion or stimulation of the afferent nerves. Shock-producing doses of histamine or extraneous blood did not produce shock in deep hypothermia. Cessation of respiration and profound hypotension were evident when the body was cooled beyond 15° C., and clinical death occurred at body temperatures 15-20° C. below normal. Local application of 4 ml. of a 3% KCl solution to isolated hind extremity receptors with innervation intact induced temporary restoration of respiration and a slight increase of blood pressure (up to 30 mm. Hg).

6909

[THE PROBLEM OF ACUTE HYPOTHERMIA: THE DEVELOPMENT OF HYPOTHERMIA AND RESTORATION OF FUNCTIONS IN THE OVERCOOLED ORGANISM OF WARM-BLOODED ANIMALS] К проблеме острой гипотермии: развитие гипотермии и восстановление функций переохлажденного организма теплокровных животных. — Ed. by P. M. Starkov. 288 + 1 p. Moskva: Gosudarstvennoe Izdatel'stvo Meditsinskoi Literatury, 1957. In Russian. DNLM [QT160.S795K, 1957]

This is a collection of papers on the experimental study of the physiology of hypothermia. The following articles are of special interest: P. M. Starkov, The problems of hypothermia (p. 5-33); O. A. Karpovich, Changes in the motor conditioned reflex in dogs during overcooling and rewarming (p. 37-47); P. G. Zherebchenko, Characteristics of the faradic excitability of the motor analyzer in the overcooled organism of warmblooded animals (p. 47-55); O. A. Karpovich, Variations of the excitability of nerves, muscles, and the motor centers of the spinal medulla of rabbits upon overcooling and rewarming (p. 70-80); Z. P. Kuznetsova, Changes in the gas exchange of rabbits as a result of single and repeated overcooling (p. 95-107); P. M. Starkov, Changes in respiration, arterial pressure, and electrical activity of the heart during overcooling of the organism (p. 107-114); I. G. Varman, Blood flow time under hypothermia (p. 114-123); I. G. Varman, The effect of overcooling on the volumetric rate of blood-flow in the hind limbs of the dog (p. 124-130); I. G. Varman, Changes in the volume of the spleen and kidneys in hypothermia (p. 130-137); I. G. Varman, The volumetric rate of blood flow in certain internal organs in hypothermia (p. 137-146); V. M. Pokrovski and V. M. Bensman, Prevention of ventricular fibrillation in hypothermia (p. 161-168); E. M. Prokop'eva, The limits of overcooling and survival in puppies (p. 211-219); E. M.

Prokop'eva, Changes in arterial pressure during overcooling of puppies and subsequent recovery of their vital functions (p. 219-230); Z. P. Kuznetsova, Characteristics of gas exchange during warming and the independent restoration of functions in over-cooled animals (p. 239-252); I. P. Burula, The effect of certain analeptics and of alpha-dinitrophenol on restoration of the body temperature of rabbits after overcooling (p. 268-275); and I. P. Burula, The effect of warming, sympathomimetic agents, alpha-dinitrophenol, oxygen, and carbogen on the restoration of arterial pressure and body temperature in over-cooled animals (p. 276-287).

6910

Rodahl, K.,
and D. W. Rennie
COMPARATIVE SWEAT RATES OF ESKIMOS AND CAUCASIANS UNDER CONTROLLED CONDITIONS.—Arctic Aeromedical Lab., Ladd Air Force Base, Alaska (Project no. 8-7951). Report no. 7, March 1957. 20 p. UNCLASSIFIED

Sweat loss in a group of Eskimos was compared with that of the same number of white control subjects studied simultaneously at various temperature levels, at rest, and while exercising under controlled conditions. The fundamental difference in the groups from the standpoint of thermal regulation appears to center upon the increased metabolism of the Eskimo. In the absence of any demonstrable difference in heat storage, an elevated skin temperature and consequent increased sweat activity are logical mechanisms to permit an increased dissipation of heat in the Eskimo group. There is no evidence to indicate that the Eskimo differs from the white in any way as far as this heat loss mechanism is concerned.

6911

Rossini, L.
[BEHAVIOR OF CONDITIONED REFLEXES OF THERMAL ORIGIN IN GRADUAL HYPOTHERMIA] Comportamento di riflessi condizionati di origine termica nella ipotermia graduale.—Bollettino della Società italiana di biologia sperimentale (Napoli), 33 (6): 764. July 1957. In Italian. DNLM
Conditioned reflexes of the head induced in guinea pigs by immersion of the paw in water at different temperatures were studied during various stages of hypothermia (at body temperatures of 32°, 27°, 24° C.). Conditioned reflexes were found to persist in the normal manner during hypothermia.

6912

Ruhe, C. H. W.
EFFECT OF HYPOTHERMIA ON THE BRAIN.—Univ. of Pittsburgh, Pa.; issued by School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 57-104, July 1957. 14 p. AD 144 408 UNCLASSIFIED

In preliminary experimentation the normal pattern of cooling rabbits in ice water and the physiologic criteria of impending death were established. Then animals were cooled to a critical pre-lethal level and rewarmed in water of 40° to 45° C. with or without additional warming of the head region by diathermy. From 18 animals treated in this manner 12 survived by only body rewarming, but 29 out of 33 animals survived when the diathermy procedure was applied additionally. With the use of diathermy, the fall in brain temperature usually observed at the onset of immersion rewarming was prevented, and brain rewarming was significantly accelerated. Animals

completely recovered from almost lethal hypothermia, by either method of resuscitation, demonstrated no harmful effects upon their normal habits, growth, and conditioned reflexes. (Author's abstract)

6913

Saakov, V. A.
[HYPOTHERMIA] Gipotermiya.—Kiev: Gosudarstvennoe Meditsinskoe Izdatel'stvo USSR, 1957. 158+[1] p. In Russian. DNLM [WO 350 8111g, 1957]

The dynamics of hypothermia, methods of induction, and the physiology of the hypothermic organism are discussed under the following topic headings: (1) general observations; (2) functional condition of various parts of the central nervous system in hypothermia induced by cooling: changes in the reflexes originating from the carotid reflexogenous zones, changes in the excitability of the peripheral nerves, shifts of the autonomic balance, bioelectric activity and the response of the cerebral cortex during different stages of hypothermia; (3) functional shifts in the CNS during hypothermia induced by a combination of cooling with narcotic and neuroplegic substances; (4) blood transfusion shock in the first-stage hypothermia; (5) blood transfusion shock in deep hypothermia; and (6) conclusions. (207 references)

6914

Scholander, P. F.,
K. L. Andersen, J. Krog, F. V. Lorentzen, and J. Steen
CRITICAL TEMPERATURE IN LAPPS.—Jour. Applied Physiol., 10 (2): 231-234. March 1957. DLC (QP1.J72, v. 10)

Skin and critical temperatures of nomadic Lapps, living in the northern part of Norway, have been determined in the winter. Skin temperature measurements taken under the clothing gave values well inside those which correspond to our own comfort, even under very cold outside conditions, indicating that the microclimate underneath the Lapps' fur winter clothing is almost tropical. Studies on the metabolic cost of maintaining the rectal temperature constant, while sitting naked and pedaling an ergometer wheel in a cold room, showed that the critical temperature in Lapps is about 27° C., which is the same as for naked man living in a temperate climate. These data indicate that the Lapps are not normally subjected to cold stress, and that they do not have any greater physiological insulation than man living in a temperate climate. (Authors' abstract)

6915

Smith, Audrey U.
PROBLEMS IN RESUSCITATION OF MAMMALS FROM BODY TEMPERATURES BELOW 0° C.—Proc. Roy. Soc. (London), series B, 147 (929): 533-544, plates 25-26; discussion, p. 545. Dec. 1957. DLC (Q41.L7, v. 147)

Attempts were made on rabbits and prosimians of the species *Galago crassicaudatus agrisymbanus* to resuscitate individuals after deep freezing by external and internal methods. Resuscitation was accomplished by artificial respiration and diathermy treatment. Rates of cooling and heating were measured with thermocouples located in various areas of the body. Hamsters alone were used to study the effects of resuscitation on the placenta, the isolated heart and other organs. Survival in the galagos and rabbits was partially successful,

the mortality after resuscitation being due partly to damage by HCl in the stomach. Hamster hearts frozen for 30 min. showed no impairment. Hearts from non-survivors would not resume beating in the whole animal frozen for 3 hours but would when isolated *in vitro*. The isolated heart would not recover from temperatures of less than -5°C . unless treated with glycerol. In the discussion, the diathermy apparatus used by the author is described.

6916

Staska, W.

[THE BEHAVIOR OF CERTAIN CIRCULATORY REFLEXES IN NORMAL CONDITIONS AND IN HYPOTHERMIA] Zachowanie się niektórych odruchów narządu krążenia w normie oraz w sztucznej hipotermii. — *Acta physiologica polonica* (Warszawa), 8 (3-3a): 529-530. 1957. In Polish.

DLC (QP1.A27, v. 8)

Variations in blood pressure, blood flow, and heart rate in anesthetized dogs cooled to 27°C . and subjected to mechanical stimulation of the vagus nerve and to occlusion of both carotid arteries, did not differ much from changes in normal anesthetized dogs subjected to the same stimulations. Cooling below 27°C . ($24-25^{\circ}\text{C}$.) decreased drastically the responses of cardiac and vasomotor centers, and completely abolished the vascular responses due to vagal stimulations or to occlusion of the carotid arteries.

6917

Sternert, K.,

K. Bentke, and W. Jurczyk

[CHANGES IN BLOOD COMPOSITION AND IN BLOOD SUGAR LEVEL OF DOGS SUBMITTED TO HIBERNATION] Zmiany składu krwi i poziomu cukru we krwi u psów ozięblanych. — *Polski tygodnik lekarski* (Warszawa), 12 (19): 701-704. May 6, 1957. In Polish, with English summary (p. 704). DNLN

As dogs were cooled to a body temperature of 21°C . a considerable decrease in the number of pulse beats, respiratory movements, and leukocytes was observed, along with a shortening of the coagulation time and a prolongation of the bleeding time. These changes were proportional to the decrease in temperature. At the same time an increase in the number of blood platelets and in the blood sugar level was found. At a body temperature of 28°C . the dogs did not require ether anesthesia and did not react to continuation of hibernation (biological zero for dogs). (Authors' summary, modified)

6918

Stolzmann, Z.,

J. Chmielewski, and H. Karoń

[THE EFFECTS OF TEMPERATURE ON THE OSMOTIC STABILITY OF ERYTHROCYTES] Wpływ temperatury na trwałość osmotyczną krwinki czerwonej. — *Acta physiologica polonica* (Warszawa), 8 (3-3a): 534-535. 1957. In Polish.

DLC (QP1.A27, v. 8)

In hypotonic NaCl solutions ($10-45^{\circ}\text{C}$.), erythrocytes showed a higher osmotic resistance to higher temperature. When the temperature of the NaCl solution exceeded that of the red blood count storage medium, the erythrocytes always exhibited a higher osmotic resistance. Their resistance always decreased when the temperature of the NaCl solution was lower than that of the storage medium.

6919

Svorad, D.

THE INFLUENCE OF LOWERING THE BODY TEMPERATURE ON POSTURAL ORIENTATION OF THE ORGANISM. — *Experientia* (Basel), 13 (6): 245. June 15, 1957. In English. DLC (Q1.A1E9, v. 13)

Lowering of the body temperature through external cooling in 30 rabbits led to extinction of the Magnus body righting reflexes and later of the labyrinthine righting reflexes. Upon rewarming, the reflexes recovered in the reverse order.

6920

Sysoev, A. F.,

and A. A. Andriashchenko

[OBSERVATIONS ON THE EFFECT OF TEMPORARY HYPOTHERMIA UPON THE VITALITY IN OLD RATS] Наблюдение над действием временной гипотермии на жизнеспособность старых крыс. — *Doklady Akademii nauk SSSR* (Moskva), 117 (3): 539-541. Nov. 1957. In Russian.

DLC (AS262.S3663, v. 117)

Controlled hypothermia (cooling to $23-27^{\circ}\text{C}$. body temperature) prolonged the survival time in anesthetized rats 2.5 years or older. Physiologically impotent animals were able to reproduce after hypothermia. "Biological blood activity" increased after 2-3 such coolings.

6921

Szabuniewicz, B.

[DISTURBANCES OF THERMOREGULATION DURING HYPOXIC-HYPERCAPNIC HYPOTHERMIA IN RATS] Zaburzenia termoregulacji w hipotermii hipoksyczno-hiperkapnicznej u szczurów. — *Acta physiologica polonica* (Warszawa), 8 (3-3a): 539-540. 1957. In Polish. DLC (QP1.A27, v. 8)

Hypothermia below 20°C . caused the loss of thermoregulatory ability in rats. Anesthesia decreased the ability of animals to withstand the effects of hypothermia. While it was necessary to cool the nonanesthetized rats in $9-12^{\circ}\text{C}$. water for 3-4 hours to decrease their body temperature to $20-15^{\circ}\text{C}$., 2.5 hours were needed to lower their body temperature under anesthesia.

6922

Trzebaki, A.,

and M. Jung

[THE ROLE OF ADRENALS IN LOWERING THE BLOOD PRESSURE IN HYPOTHERMIC CATS] W sprawie roli nadnerczy w spadku ciśnienia krwi w hipotermii u kotów. — *Acta physiologica polonica* (Warszawa), 8 (3-3a): 554-556. 1957. In Polish.

DLC (QP1.A27, v. 8)

At body temperatures of 30°C . and up, in anesthetized cats, the blood pressure and heart rate decreased. When the body temperature reached $26.1-20.5^{\circ}\text{C}$., administration of a KCl solution of epinephrine and of norepinephrine reduced this pressure decrease. Preliminary administration of dihydroergotamine (DHE) increased the pressor effect of KCl 7 times more than epinephrine, and the depressor effect 2.4 times more seldom. Norepinephrine, under these conditions, always produced a pressor effect. It is concluded that KCl, exerting a stimulating effect on the adrenal medulla, loses its effect in hypothermia, and that the suppression of adrenal medullary excitability may be responsible for the arterial hypotension in hypothermia.

6923

Villamil, A.,

R. J. Franco, J. Clavijo, and E. Martinez Zuñiga
ELECTROCARDIOGRAPHIC CHANGES IN ARTIFICIAL HIBERNATION.—*Amer. Heart Jour.*, 53 (3): 365-379. March 1957. DLC (RC681.A1A58, v. 53)

The electrocardiograms of 10 subjects (8 male and 2 female) between 6 and 47 years were taken after these subjects were submitted to artificial hypothermia. In 8, the records were obtained serially at different body temperatures from 38 to 24° C. Pulse rate increased in all cases during the induction period, and in one case it was accompanied by auricular fibrillation. However, once hypothermia was stabilized, all subjects showed a decrease in pulse rate together (in most cases) with a prolongation of the P-R and QRS intervals. The Q-T interval was considerably prolonged and closely related to the descent in body temperature and concomitant marked change of the S-T interval. The tendency of the heart to present severe arrhythmias when the temperature fell below 28° C. was not present when the method of neurovegetative disconnection was used together with the cold. (Authors' summary, modified)

6924

Willard, P.,

and S. M. Horvath

RESPONSES OF RATS TO HYPOTHERMIC CARDIAC ARREST [Abstract]. *Physiologist*, 1 (1): 90. Nov. 1957. DNLM

Eighteen rats were subjected to hypercapnia, anoxia, and cold followed by immersion in an ice bath in which their colonic temperatures were reduced to an average of 1.3° C. In all cases electrocardiographic P waves disappeared before the rats were immersed in the ice bath and the heart beat became progressively more idioventricular as the cooling proceeded. Electrical activity from the heart was no longer evident when the colonic temperature reached an average of 4.1° C. Cardiac arrest was maintained for an average of 43 minutes. On re-warming electrical activity became evident again at an average colonic temperature of 7.6° C. An exponential relationship was found between the heart rate and colonic temperature during both the cooling and re-warming phases. (Authors' abstract, modified)

6925

Wiskont-Buczkowska, H.

1957

[GASEOUS EXCHANGE IN HYPOXIC-HYPERCAPNIC HYPOTHERMIA IN RATS] Wymiana gazowa w hipotermii hipoksyczno-hiperkapnicznej szczurów. — *Acta physiologica polonica* (Warszawa), 8 (3-3^a): 567-568. 1957. In Polish. DLC (QP1.A27, v. 8)

While mild hypothermia did not alter metabolic processes in rats, body temperatures below 20° C. decreased them and reduced oxygen consumption. Administration of evipan (n-methyl-cyclo-hexenyl-methyl barbituric acid) sodium in animals at body temperatures below 20° C. drastically reduced metabolic processes and often produced death. (Author's abstract, modified)

6926

Ziemlański, S.,

and L. Markiewicz

[THE EFFECTS OF HYPOTHERMIA AND HIBERNATION ON VASCULAR REACTIONS INDUCED BY STIMULATION OF THE VAGUS AND SCIATIC

NERVES] Wpływ hipotermii i hibernacji na reakcje krążeniowe pod wpływem drażnienia nerwu błędnego i krzyżowego. — *Acta physiologica polonica* (Warszawa), 8 (3-3^a): 599-591. 1957. In Polish.

DLC (QP1.A27, v. 8)

Electrical stimulation of the cardiac segment of the severed vagus nerve decreased the body temperature, blood pressure, and heart rate and increased respiration. Hypothermia below 30° C. decreased, and at 25-23° C. abolished, these effects. Stimulation of the cranial segment of the nerve first increased then decreased the blood pressure (which finally returned to normal) and first increased, then abolished respiration. Hypothermia of 25-23° C. abolished these effects. Stimulation of the central segment of the sciatic nerve increased the blood pressure and respiration; hypothermia (24-20° C.) abolished these effects. Drug-induced hibernation diminished effects of vagus and sciatic nerve stimulation.

f. Alimentary and Excretory Physiology

[Flight feeding under 11-g]

6927

Barker, E. S.,

R. B. Singer, J. R. Elkinton, and J. K. Clark

THE RENAL RESPONSE IN MAN TO ACUTE EXPERIMENTAL RESPIRATORY ALKALOSIS AND ACIDOSIS.—*Jour. Clinical Investigation*, 36 (4): 515-529. April 1957. DLC (R11.J67, v. 36)

Acute respiratory alkalosis by voluntary hyperventilation for approximately 30 minutes, or acidosis by CO₂ inhalation for a similar period, were induced in normal human subjects. The urinary excretion of water and electrolytes and the acid-base pattern of the urine were observed in multiple clearance periods before, during, and after the respiratory stimuli. In respiratory alkalosis the kidney responded promptly by retaining hydrogen ion. Urinary pH rose and titratable acidity, ammonium ion, and phosphate excretion fell. Chloride excretion tended to vary with that of sodium, increasing slightly during hyperventilation and then falling far below the control level. Changes observed during respiratory acidosis were, for most variables, opposite in direction to those noted during hyperventilation. They were smaller in magnitude since the experimental acute respiratory acidosis by CO₂ inhalation was a milder acid-base disturbance than that produced by hyperventilation. (42 references) (Authors' summary, modified)

6928

Delfosse, J.

[DIET OF EFFORT] Dietetique de l'effort.—*Acta belgica de arte medicinali et pharmaceutica militari* (Bruxelles), 110 (3): 345-352. Oct. 1957. In French with English summary (p. 351-352). DNLM

During training, the daily ration of an athlete should consist of 2,500 to 6,000 calories (200-300 grams of proteins, 60-100 grams of fats, and a maximum of 50 grams of white sugar). The caloric excess must be provided in the form of various carbohydrates. This ration must be balanced in the amount of minerals and vitamins. Calcium and phosphorus may be supplied by a pint of milk. Vitamin-enriched rations, the necessity for which is controversial in the United States, are justified in Belgium where the nutrition of

amateur athletes from the working class is deficient. At the time of competition, an athlete must be able to provide himself with a carbohydrate reserve by means of easily digestible food rich in glucides. (Author's summary, modified)

6929

Grande, F.,

J. T. Anderson, and H. L. Taylor

EFFECT OF RESTRICTED WATER INTAKE ON URINE NITROGEN OUTPUT IN MAN ON A LOW CALORIE DIET DEVOID OF PROTEIN. — Jour. Applied Physiol., 10 (3): 430-435. May 1957.

DLC (QP1.J72, v. 10)

Three groups of young men were given daily 900 ml., 1800 ml., or unlimited quantities of water, respectively. Caloric intake was restricted to 1000 Cal. daily, and 120 Cal. were expended in walking. The 900 ml.-group had the greatest output of urinary nitrogen, and this group also showed an increase in blood urea nitrogen at the same time. Fecal nitrogen was unchanged and that in the sweat was only slightly decreased if any by water restriction. The increased nitrogen excretion is considered as a metabolic response to the stress of dehydration. This response is of no aid in economizing water, as shown by the fact that men receiving the smallest volume of water excreted the most urine at the day of their maximal dehydration. (27 references)

6930

Kolder, H.

[EXTRARENAL AND RENAL WATER OUTPUT DURING SLEEP AT 37° C.: ROOM TEMPERATURE AND WATER INTAKE] Extrarenale und renale Wasserabgabe im Schlaf bei 37° C.: Raumtemperatur und Flüssigkeitszufuhr. — Zeitschrift für Biologie (München), 109 (3): 192-196. 1957. In German, with English summary (p. 195). DNLN

An experiment was run with one subject to investigate the effects of water consumption on renal and extrarenal excretion during sleep. With the environmental temperature held at 37° C. the extrarenal output rises significantly with the consumption of smaller quantities of water but soon reaches a maximum; whereas the renal excretion rises only very little at the same levels of intake. Consumption of quantities over 800 cc., however, leads to diuresis. These results demonstrate that it is not possible to compensate for thermoregulatory fluid loss during sleep at excessive environmental temperatures through intake of a single large amount of water before sleep. (Author's summary, modified)

6931

Lindop, P. J.

THE EFFECT OF AGE ON THE RENAL RESPONSE TO A STRESS. — Gerontologia (Basel), 1 (1): 86-91. 1957. DNLN

A marked reduction in both the renal blood content and the ability to reduce this in response to a period of asphyxia (stress) was found in the kidneys of 50 rabbits between 1 day and 3 years old.

6932

Margaria, R.

[ABSURDITY OF THE INGESTION OF SEA WATER FOR THE MAINTENANCE OF WATER BALANCE] Irrazionalità dell'ingestione di acqua di mare per il mantenimento del ricambio idrico. — Rivista di

medicina aeronautica (Roma), 20 (2): 210-223.

April-June 1957. In Italian, with English summary (p. 221). DLC (RC1050.R56, v. 20)

The absurdity is demonstrated of the opinion that sea water, pure or diluted with fresh water or fish juice, can be used for unlimited periods of time to maintain body water balance. Sea water causes increased renal excretion of electrolytes and osmotic withdrawal of water from the tissues. Sea water intake accompanied by a high-protein diet, exclusively or nearly composed of fish, induces renal hyperfunctioning in order to excrete urea, thereby increasing the water loss. Sea water, pure or diluted, is not recommended for use in the maintenance of the water balance.

6933

Marotta, S. F.,

1957

and S. G. Stolpe

HUMAN URINARY STEROID EXCRETION AS MODIFIED BY DIET AND SODIUM CHLORIDE [Abstract]. — Federation Proceedings, 16 (1, part 1): 84. March 1957. DLC (QH301.F37, v. 16)

During starvation, and to a lesser extent on the basal diet (2100 calories, 50% carbohydrate, 13% protein, 26% fat), six subjects showed a marked decrease from the preperiod 17-ketosteroids (17-KS) and dehydroisandrosterone (DIA), whereas only slight variations occurred during the basal and customary diets (unlimited calories). When sodium chloride (NaCl) was given during the starvation, carbohydrate, and basal diet periods a marked increase in 17-KS and DIA resulted on the first 2 days of the experimental periods. Total ketosteroids remained relatively constant on all diets, with and without NaCl, except during starvation which produced marked decreases. All regimens, with and without NaCl, produced an initial drop in 3-ketone steroids and a slight increase in Porter-Silber chromogens. The above evidence suggests that changes in adrenocortical function produced by diet can be altered by NaCl ingestion. (Authors' abstract, modified)

6934

Palakawong, M.

FOOD AND THE FLYER. — Royal Thai Air Force Med. Gaz. (Bangkok), 6 (5): 370-374. Oct. 1957. In Thai. DNLN

A brief discussion is presented on nutrition in general, and especially as related to the pilot. A well-balanced diet is essential not only for physical well-being, but also for scotopic and photopic vision.

h. Other Systems

6935

Herbert, M. J.

THE SPEED AND ACCURACY WITH WHICH SIX LINEAR ARM MOVEMENTS CAN BE VISUALLY POSITIONED FROM TWO DIFFERENT CONTROL LOCATIONS. — Army Medical Research Lab., (USAMRL Project no. 6-95-20-001, Subtask S-1). Report no. 260, March 25, 1957. 11+14 p. AD 126 847 UNCLASSIFIED

Linear arm movements along the Y-axis (up-down) were faster and more accurate than those in the other two axes. Movements along the Z-axis (push-pull) were more accurate than those on the X-axis (left-

right). Speed of response was greater on the X-axis than on the Z-axis. In the right-arm movements of up, down, left, right, push and pull, "down" was most accurate and "push" the slowest. Equivalent scores for time and accuracy indicated that both mid-body and right-front control locations were equally acceptable. Results indicate that control location at the mentioned positions does not differentially influence performance. The speed and accuracy of linear movements are considerably affected by whether the arm is supported or unsupported. The influence of tremor and fatigue in the unsupported arm is concluded to be the major variable accounting for movement differences. (Author's results and conclusions)

6936

Hutt, B. K.,

S. M. Horvath, and G. B. Spurr

INFLUENCE OF VARYING DEGREES OF "PASSIVE" LIMB MOVEMENTS UPON RESPIRATION AND OXYGEN CONSUMPTION OF MAN [Abstract].—*Physiologist*, 1 (1): 44. Nov. 1957. DNLM

Measurements of gaseous exchange were carried out during 17 experiments on 10 adult male subjects. One, three or six joints were passively moved at a constant rate of 20/minute in each subject. A 26% increase in ventilatory minute volume occurred consequent to passive movement of a single joint with no change in oxygen consumption. Movement of 3 or 6 joints produced a further increase in minute volume but was accompanied by similarly significant elevations in oxygen consumption. Apparently peak responses were obtained following movements of three joints. (From the authors' abstract)

6937

Josenhans, W. C. T.

PHYSICAL FITNESS, MUSCLE FORCE AND ENDURANCE OF MALE ADULTS OF OVERWEIGHT.—*Internationale Zeitschrift für angewandte Physiologie* (Berlin), 19 (3): 173-182. 1962. In English. DNLM

The physical fitness of overweight males for doing stationary work, was found to be about equal to a normal-weight control group of the same age and height. The muscle force of grip muscles and elbow and knee flexors and extensors was significantly higher. The muscle endurance for phasic and static contraction was lower in the overweight group. This combination of (a) equal circulatory performance for stationary work, (b) higher muscle force, and (c) lower muscle endurance for static and phasic work, is most logically explained by the lesser physical activity of the overweight individual in this series. (Author's summary)

6938

Riendeau, R. P.,

B. E. Welch, C. E. Crisp, L. V. Crowley, P. E. Griffin, and J. E. Brockett

THE RELATIONSHIPS OF BODY FAT TO MOTOR FITNESS TEST SCORES.—Fitzsimons Army Hospital. Army Medical Nutrition Lab., Colorado. Report no. 209, Aug. 8, 1957. [10] p. AD 142 000

UNCLASSIFIED

The relationships between per cent body fat and six selected motor fitness tests were determined in sixty-one young men. The per cent body fat was

derived from density determined by hydrostatic weighing. Significant negative correlations of from -0.29 to -0.68 were obtained between performance in the selected motor fitness test items and per cent body fat. The motor fitness test items most affected by fat were those which involved running and jumping. Weight did not significantly affect the performance of any of the test items except the 220 yard dash. (Authors' summary and conclusions)

6939

Rozenblat, V. V.

[ADDITIONAL DATA ON CHANGES OF MUSCULAR WORKING CAPACITY INFLUENCED BY THE ACTIVITY OF OTHER MUSCULAR GROUPS] Dal'neishie materialy ob izmeneniiakh rabotosposobnosti myshts pod vlianiem deiatel'nosti drugikh myshechnykh grupp.—*Biulleten' eksperimental'noi biologii i meditsiny* (Moskva), 43 (3): 16-19. March 1957. In Russian; with-English summary (p. 19). DLC (R850.B55, v. 43)

A mercury dynamometer was used to study changes in the working capacity of muscles of the hand as influenced by the work of symmetrical muscles of the other hand. The first series (76 observations of 3 subjects) showed that endurance toward static tension (measured under a load equaling one half of the strength of the tested muscles) increases during simultaneous moderate tension in the other hand equaling one third of its strength. The second series (70 observations of 6 subjects) showed that the grasping power of the hand grows when static tension in the other hand is continued to the point of fatigue; sometimes this growth goes on for several seconds after work has ceased. The central nervous mechanisms of the observed changes are analyzed. (Author's summary, Consultants Bur. translation)

6940

Vinařický, R.

[THE LIMITS OF HUMAN PERFORMANCE]

Hranice lidské výkonnosti. — *Věda život* (Praha), 1957 (2): 67-70. Feb. 1957. In Czech.

DLC (AS141.V4, v. 1957)

History shows steady improvements in athletic achievements throughout the last decades. While perfections of techniques account in part for this development, a better understanding of physiological processes and, derived from it, more favorable exploitation of these processes allow us to further increase physical performance through proper training. Energy is furnished to the body at work from two sources: stored energy supplied anaerobically and energy supplied by respiration. The latter type of energy supply is more economical, and yields increase with the amount of physical effort expended. By relating pre-established values of energy supply to given physical tasks it is possible to calculate optimum requirements for more demanding tasks. A tabulation of such values as applied to track racing events is presented. The author, who shares the belief that acquired characteristics are hereditary, recommends intensification of physical culture programs to enhance physical fitness on a national level.

4. Neuro and Sensory Physiology

[Environmental effects under 6]

a. General

6941

Birals, L.,

and A. Hemingway

NERVOUS CONTROL OF SHIVERING: SHIVERING AS A RESULT OF BRAIN STIMULATION—Arctic Aeromedical Lab., Ladd Air Force Base, Alaska. Technical Report no. 57-10, June 1957. 14 p.

UNCLASSIFIED

Electrical stimulation at 21 sites in the brain stem of 5 cats under light barbiturate anesthesia resulted in the production of a tremor having the characteristics of natural shivering. The positive stimulation sites lay within the lesion-determined "shivering pathway" in the midbrain and pons. The positive hypothalamic stimulation site was located in the medial part of the tuberal hypothalamus, between the mammillothalamic tract and the fornix. (Authors' summary)

6942

Birzis, L.,

and A. Hemingway

NERVOUS CONTROL OF SHIVERING. VI. EFFERENT BRAIN DISCHARGE DURING SHIVERING.—Arctic Aeromedical Lab., Ladd Air Force Base, Alaska. Technical Report no. 57-11, June 1957. 17 p.

UNCLASSIFIED

Action potentials associated with shivering have been recorded from the brain stem of the cat using large (25 μ diameter) microelectrodes. The electrodes were located within the efferent shivering pathway previously determined by lesion experiments. The range of frequencies from these units was between 6 and 26 per second and appeared as a continuous stream of impulses having no rhythmic pattern. (Authors' summary)

6943

Dement, W.,

and N. Kleitman

CYCLIC VARIATIONS IN EEG DURING SLEEP AND THEIR RELATION TO EYE MOVEMENTS, BODY MOTILITY, AND DREAMING.—Electroencephalography and Clinical Neurophysiol. (Montreal), 9 (4): 673-690. Nov. 1957.

DNLM

In 33 adults, discrete periods of rapid eye movement potentials were recorded without exception during each of 126 nights of undisturbed sleep. These periods were invariably concomitant with a characteristic EEG pattern, stage 1. Composite histograms revealed that the mean EEG eye movement incidence underwent regular cyclic variations throughout the night with the peaks of eye and body movement coinciding with the lightest phase of the EEG cycles. A further analysis indicated that body movement after rising to a peak, dropped sharply at the onset of rapid eye movements and rebounded abruptly as the eye movement ceased. Records from a large number of nights in single individuals indicated that some could maintain a very striking regularity in their sleep pattern from night to night. The stage 1 EEG at the onset of sleep was never associated with rapid eye movements and was also characterized by a lower

auditory threshold than the later periods of stage 1. No dreams were recalled after awakenings during the sleep onset stage 1, only hypnagogic reveries. (Authors' summary)

6944

Guljaev, P. I.

1957

[STAGES OF SLEEP AND PERIODIC WAVES OF EXCITABILITY IN THE EEG OF A SLEEPING MAN] Fazy i otkraschenie evoliutsii voln vzbudimosti v EEG splyashchego cheloveka. — Fiziologicheski zhurnal SSSR (Moskva), 43 (2): 126-133. Feb. 1957. In Russian, with English summary (p. 133). DLC (QP1.F57, v. 43)

English translation in: Sechenov Physiol. Jour. USSR (Pergamon Press, New York), 43 (2/3): 115-123. 1957. DLC (QP1.F573, v. 43)

The electroencephalogram of sleeping man reveals a sequence of phases of rhythmical valleys, showing that the depth of sleep develops in a manner similar to phases of parabiosis. By means of functional electroencephalography some typical EEG patterns—evolution coincident with the development of inhibition (depth of sleep) have been discerned. According to Pavlov's conception of functional lability, it depends on a tidal alternation of excitatory-inhibitory processes. It may be seen as rhythmical valleys and the electrical stages in EEG recordings. The lability, as conceived by Vvedenskii is represented by rhythm frequencies in the EEG. Electroencephalogram patterns displayed with increasing depth of sleep reveal a decline of lability according to either of these interpretations. Their inherent relationship has thus been demonstrated experimentally as a tidal alternation of electrical activity during sleep. (Author's abstract)

6945

Lansing, R. W.

RELATION OF BRAIN AND TREMOR RHYTHMS TO VISUAL REACTION TIME.—Electroencephalography and Clinical Neurophysiol. (Montreal), 9 (3): 497-504. Aug. 1957.

More than 100 visual reaction times were measured for each of 8 normal adult subjects while recording the EEG of the visual and motor cortex, and the tremor rhythm of the executant finger. The incidence of the brief flash of light, constituting a stimulus for each reaction, was determined relative to the phase of alpha and tremor rhythms, as was also the finger response. The hypothesis that an excitability cycle is associated with the alpha rhythms, is supported by both group and individual data which relate mean reaction times to the point of incidence on the occipital alpha cycle. The shortest and longest reaction times were found at points 50 msec. apart and in opposite phases of the alpha cycle. Also the predominant number of finger responses associated with a given phase of the motor alpha cycle leads to the inference that this particular portion of the alpha wave represents the period of optimal excitability of the motor cortex. The periods of enhanced excitability for motor and occipital alpha cycles were found to coincide. (From the author's summary)

6946

Tolhurst, G. C.

DELAYED RESPONSE: EFFECTS UPON SPEECH RECEPTION AND SPEAKER INTELLIGIBILITY.—Ohio State Univ. Research Foundation, Columbus (Contract N00NR 23525); issued by Naval School of Aviation Medicine, Pensacola, Fla. (Project no. NM 18 02 99, Subtask 1). Report no. 74, Aug. 18, 1957. 11+15 p. AD 154 613 UNCLASSIFIED

Delaying written and/or verbal responses zero to five seconds resulted in progressive increases to the reception and intelligibility scores of multiple-choice intelligibility tests as well as to speaker intelligibility scores of phonetically balanced (PB) word tests. Five seconds response delay yielded the highest scores; however, one second delay gave the highest scores for PB listener reception. (Author's abstract)

6947

Wulfften Palthe, P. M. van

ELECTRO-ENCEPHALOGRAPHIC EXAMINATION IN HEALTHY YOUNG MEN.—In: The first European congress of aviation medicine, p. 207-225. *Aeromedica acta* (Soesterberg, Netherlands), Special edition, 1957. In English. DNLM

Same as item no. 5189, vol. IV.

b. Vision

[Eye examination under 8-f]

6948

Berens, C.,

L. B. Sheppard, and J. H. Bickerton

ABSTRACTS ON MILITARY AND AVIATION OPHTHALMOLOGY AND VISUAL SCIENCES.—Vol. III. xiii+466 p. Washington: Biological Sciences Foundation, Ltd., 1957. DLC (Z6669.B4, 1957)

The third volume of this important series contains 1713 abstracts of the literature on military and aviation ophthalmology which was published during the period from 1946 through 1948. With this volume, the literature in this field, as it applies to military and aviation medicine, of nearly a century and a half has been presented (as volumes I and II covered that of the period from 1800 through 1945). The references are grouped according to a rather detailed subject breakdown.

6949

Best, W.,

and K. Bohnen

[INVESTIGATIONS OF THE HUMAN ELECTRORETINOGRAM BY MEANS OF COLORED LIGHT STIMULI] Untersuchungen über das Elektretinogramm des Menschen bei Verwendung farbiger Lichtreize.—*Bibliotheca ophthalmologica* (Basel), no. 48: 77-86. 1957. In German. DNLM

Under certain conditions the electroretinographic flicker fusion frequency may be higher than the subjective flicker fusion frequency. At a certain frequency of light flicker of high intensity every other response on the electroretinogram is higher and the potentials in between lower. This phenomenon is most pronounced with flashing red light. It is not observed with a blue light stimulus. After a longer illumination period an off-effect appears, composed of two or three distinct positive potentials, most marked with a red light stimulus. A double a-wave can be best observed during moderate light-adaptation (regardless of the color of the light).

During a single stimulus presentation of a red light at various intensities, the x-wave changes over into a b-wave. The results are discussed in terms of three hypotheses concerning the x-wave as an expression of photopic and/or scotopic activity.

6950

Best, W.,

and K. Bohnen

[ON THE "OFF-EFFECT" IN THE HUMAN ELECTRORETINOGRAM] Über den "off-Effekt" im Elektretinogramm des Menschen.—*Albrecht von Graefes Archiv für Ophthalmologie* (Berlin), 158 (8): 568-577. 1957. In German. DNLM

In the human electroretinogram an off-effect may be demonstrated only after light adaptation, not after dark-adaptation. With short stimuli the off-effect is superimposed on the on-effect which results in a common positive wave. If the stimulus time is shortened the off-effect expands. Under certain conditions it may consist of several positive waves. Most experiments were carried out with three subjects, some with 20 subjects. The results and the mechanism of the off-effect are discussed. (Author's summary)

6951

Bhatia, B.

EYE MOVEMENT PATTERNS IN RESPONSE TO MOVING OBJECTS.—*Jour. Aviation Med.*, 28 (3): 309-317. June 1957. DLC (RC1050.A36, v. 28)

Eye movements of two subjects were recorded by the corneoretinal potential method while they viewed an object moving vertically downward at certain uniform speeds and appearing behind a slit at regular intervals. The time of appearance and disappearance of the object at the slit was also recorded. The response of the eyes is characterized by slow downward drifts during the time of exposure of the object at the slit, followed by the return of the eyes to the upper border of the slit by a flicking movement. This pattern of the eye movement is observed irrespective of the angular velocity of the object except that at higher angular velocities there are occasional downward flicks superimposed on the drifts during the time of exposure of the object. (Author's summary)

6952

Bleichert, A.,

and R. Wagner

[ON THE FREQUENCY COURSE OF PUPIL REACTION TO LIGHT] Über den Frequenzgang der Pupillenreaktion auf Licht.—*Zeitschrift für Biologie* (München), 109 (4): 281-296. 1957. In German, with English summary (p. 296). DNLM

Pupil reaction to sinusoidal changes of light intensity was investigated by infra-red cinematography. The phase angle between the changes of stimulating light and the diameter of the pupil, the amplitude of the change of the diameter, the mean diameter of the pupil, and the change of the retinal illumination have been measured and are represented as a function of the amplitude and the frequency of the stimulating light. (Authors' summary)

6953

Bornschein, H.,

and G. Schubert

[THE STANDING POTENTIAL AND THE STATE OF ACCOMMODATION OF THE HUMAN EYE] Bestand-

potential und Akkommodationszustand des menschlichen Auges.—Albrecht von Graefes Archiv für Ophthalmologie (Berlin), 159 (1): 45-51. 1957. In German. DNLN

The effect of accommodation on the standing potential of the eye was investigated in three normal subjects. Electro-oculograms were registered of identical blinking movements of the right eye after binocular far and near accommodation (object distance, 6 m. and 20 cm., respectively). The experiment was conducted with intact and paralyzed accommodation capacity of the right eye. The standing potential was shown to be independent of the state of accommodation. Accommodation potentials obtained from the sclera under the same experimental conditions are to be interpreted as action potentials of the ciliary muscle.

6954

Bourdy, C.

[CONTRIBUTION TO THE STUDY OF THE BINOCULAR VISION OF SPACE] Contribution à l'étude de la vision binoculaire de l'espace.—Revue d'optique (Paris), 36 (10): 449-475; (12): 571-598. Oct. and Dec. 1957. In French, with English summary (p. 449). DNLN

The behavior of binocular convergence in night vision studied on various subjects by a subjective method revealed that the fusion reflex diminished proportionately with decreases in luminance. Convergence was attained in total darkness and was independent of the distance of the test field. Heterophoria did not play a decisive part in the observed phenomena. On the other hand, ametropia seemed to be involved in a systematic manner. Emmetropic subjects had a convergence limit intermediate between the myopic (convergence limit stronger) and the hypermetropic (convergence limit weaker). This phenomenon of binocular night convergence explains, in part, night myopia. The convergence limit is not a fact peculiar to night vision; it also occurs, at least in part, if all fusional matter in the visual field is suppressed, whatever the luminance may be. The relationship is discussed between the observed phenomena and the theoretical visual space established by Luneburg. A study is made of the visual space of a subject, following an interpretation of Luneburg's theory proposed by Hardy, and values obtained are compared by calculation and by experiment. (Author's summary, modified) (49 references)

6955

Boynston, R. M.,
and G. Kandel

ON RESPONSES IN THE HUMAN VISUAL SYSTEM AS A FUNCTION OF ADAPTATION LEVEL.—Jour. Optical Soc. Amer., 47 (4): 275-286. April 1957. DLC (QC350.06, v. 47)

Visual thresholds were determined at various short times before and after the onset of a 38-mL conditioning stimulus in the dark-adapted eye, and following six other levels of pre-adaptation. An outstanding feature of the results is that under certain conditions thresholds decrease with increasing pre-adapting luminance. The results are considered to provide an indirect picture of on-responses in the visual system. The relation between "masking" associated with these on-responses and those effects attributable to photochemical bleaching is assessed and discussed. (Authors' abstract)

6956

Brown, John L.,

M. P. Kuhns and H. E. Adler

RELATION OF THRESHOLD CRITERION TO THE FUNCTIONAL RECEPTORS OF THE EYE.—Jour. Optical Soc. Amer., 47 (3): 198-204. March 1957. DLC (QC350.06, v. 47)

Luminance thresholds in the dark adapted eye for the resolution of parallel line grating patterns were determined by the method of constant stimuli using various color filters and neutral tint filters. The 7 gratings required a visual acuity of 0.042 to 0.625. At high acuity requirements, luminance thresholds were the same for all color filters. As the requirements decreased, the thresholds became higher with red filters and lower with blue filters compared to other colors. It is assumed that changes in threshold may be related to changes of visual function from rod function through mesopic function to cone function. In situations where individuals are adapted to a visual field of low luminance and must periodically, in short glimpses, read displays of higher illumination, the effectiveness of illumination wavelengths will depend on the visual acuity required to read the display.

6957

Brown, R. H.

'EMPTY-FIELD' MYOPIA AND VISIBILITY OF DISTANT OBJECTS AT HIGH ALTITUDES.—Amer. Jour. Psychol., 70 (3): 376-385. Sept. 1957. DLC (BF1.A5, v. 70)

Use of three collimated reticle patterns was found to have no significant effect on the detection of small targets against a bright, empty visual field, using binocular vision and cues for near vision. The threshold-size of targets was found to decrease from the outer part of the visual field to its center. At a given distance from the center, position of the targets had no effect on detection. Large individual differences in target detection were observed, which were apparently associated with the refractive condition of the eye.

6958

Chapanis, A.,

and D. M. Forsyth

ESTIMATION OF LIGHT PULSES AS A FUNCTION OF RETINAL LOCATION [Abstract].—Amer. Psychologist, 12 (7): 441. July 1957.

DLC (BF1.A55, v. 12)

Estimates were made of the number of light flashes presented at 6 frequencies from 2.5 to 30 c.p.s. and at 6 retinal positions from 0 to 40 degrees. Estimates were found to decrease at all frequencies with increasing eccentricity of retinal location, and at all retinal positions with increases in frequency.

6959

Clark, W. C.

THE EFFECT OF VARYING THE TEMPORAL CHARACTERISTICS OF SINGLE AND MULTIPLE LIGHT PULSES ON THE PHOTOPIC AND SCOTOPIC DETECTION THRESHOLD [Abstract].—Amer. Psychologist, 12 (7): 441-442. July 1957.

DLC (BF1.A55, v. 12)

Detection thresholds for single and multiple light pulses were obtained by the method of constant stimuli with temporal forced choice. For single light pulses, time-luminance reciprocity was found up to 0.025 second for the photopic and 0.1 second for the

scotopic condition. Addition points of inflection were found in the time-luminance relation at longer pulse durations. Integration of double-pulse data with respect to time yielded a function fitting the single-pulse curve over a considerable range. Increasing numbers of pulses up to 10 decreased the contrast threshold by amounts varying with pulse duration and separation.

6960

Collins, J. B.,

and R. G. Hopkinson

INTERMITTENT LIGHT STIMULATION AND FLICKER SENSATION: SOME STUDIES ON THE VARIABILITY OF FREQUENCY OF INTERMITTENT LIGHT STIMULUS REQUIRED FOR CONSTANT CRITERIA OF FLICKER DISCOMFORT.—*Ergonomics* (London), 1 (1): 61-76. Nov. 1957.

DLC (TA166.E7, v. 1)

Flicker sensation depends on the frequency of the intermittent light stimulus, but the frequency required for a given criterion of flicker sensation shows marked variability for different occasions with the same observer, or for different observers. This variability was studied using the multiple criterion technique, flicker judgments being obtained from 20 subjects on a number of occasions. In one set of experiments the whole visual field was stimulated, in another a field approximately $20^\circ \times 30^\circ$. Four criteria of flicker sensation were employed including the customary criterion of "just perceptible" flicker. The results showed that: (a) small changes in stimulus frequency cause large differences in the noticeability of flicker and in the sensation of discomfort caused by flicker; (b) large changes in stimulus frequency cause little change in the apparent frequency of flicker, which remains constant around 16 c.p.s.; and (c) sensitivity varies markedly both between subjects and between occasions. (Authors' abstract)

6961

Cuccagna, F.,

and L. Bernicchi

[EFFECT OF SMELL ON THE VISUAL FIELD, LIGHT SENSE, AND OCULAR TONUS] L'influenza dell'olfatto sul campo visivo, senso luminoso e tono oculare.—*Bollettino delle malattie dell'orecchio della gola del naso* (Firenze), 75 (4): 319-330. July-Aug. 1957. In Italian, with English summary (p. 329).

DNLM

Olfactory stimuli (musk, phenylethyl alcohol) caused an increase in the visual field for white and red-green in test subjects. The sense of brightness increased after stimulation and remained unchanged after olfactory fatigue. Ocular tension showed no significant variations following stimulation and only a moderate increase in certain cases, after fatigue. Changes registered may possibly be dependent on impulses originating in subcortical centers and excited by olfactory stimulation. Cortical participation is also considered in these impulses.

6962

Deese, J.

CHANGES IN VISUAL PERFORMANCE AFTER WORK.—*Johns Hopkins Univ., Baltimore, Md.* (Contract AF 33(039)-22642); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 57-285, April 1957. iv+24 p. AD 118 266 PB 131 258

Even relatively brief periods of time spent at visual vigilance results in a reduction in visual sensitivity. The loss in sensitivity is probably increased by monotony in the environment and lack of freedom of movement. Relatively long periods of time at active tasks produce either no deterioration or very little deterioration in the capacity for further visual work unless the situation is complicated by extreme loss of sleep, anoxemia or presence of drug effects. Continuous work at active visual tasks, however, does produce depression, headaches, feelings of tiredness and irritability, and is accompanied by a general increase in somatic muscle tension. Much of the loss in sensitivity can be reduced in vigilance tasks by the use of monitoring with false signals at frequent intervals. (From the author's abstract)

6963

Doesschate, G. ten,

and R. Kummer

HETEROPHORIA AND DEPTH-DISCRIMINATION.—*Aeromedica acta* (Soesterberg, Netherlands), 5: 321-326. 1955/57. In English. DNLM

Data on heterophoria obtained from eye examinations of 5000 pilot candidates and stereopsis tests indicate a significant correlation between degrees of heterophoria and acuity of binocular depth-discrimination.

6964

Doesschate, G. ten,

and J. ten Doesschate

THE INFLUENCE OF THE STATE OF ADAPTATION ON THE RESTING POTENTIAL OF THE HUMAN EYE. II.—*Aeromedica acta* (Soesterberg, Netherlands), 5: 297-307. 1956/57. In English. DNLM

A series of experiments were conducted to test a photochemical hypothesis of the behavior of the resting potential of the eye during dark adaptation and subsequent light adaptation. The following subjects were studied: (a) the effect of the intensity level of the pre-adapting light, (b) the effect of the wave length of the pre-adapting light, and (c) the behavior of the resting potential in a subject with congenital hemeralopia. The results of experiments (b) and (c) disprove the above hypothesis and suggest that different components of neural adaptation may be responsible for the phenomena.

6965

Fletcher, D. E.

THE EFFECTS OF MODERATE AND LOW LUMINANCES AND VARIOUS DURATIONS OF PRE-EXPOSURE ON DARK ADAPTATION.—*Naval Air Development Center. Aviation Medical Acceleration Lab., Johnsville, Pa.* (Project no. NM 001 110 300, Report no. 3). Report no. NADC-MA-5706, May 2, 1957. v+30 p. AD 134 621 UNCLASSIFIED

Monocular dark adaptation data for two observers were obtained with the Hecht-Shlaer adaptometer, fitted with a 2-mm diameter artificial pupil, as absolute thresholds taken by ascending series of the method of limits. After 30 minutes in the dark, the pre-exposure was presented at a luminance of from 0.000608 to 971 millilamberts (mL) and at a duration of from 0.01 to 20 minutes. The white pre-exposure field was 35° in diameter, centered 10° nasally. The test field was green, 1° in diameter, 10° nasal in retinal location, and 0.02 second in duration. Single-limbed curves described data taken after pre-exposures of from -1.15 to 2.69 log mL-min for one

observer and from -1.93 to 2.99 log mL-min for the other. As the product of pre-exposure luminance and duration increased over this range, the dark adaptation curves decreased in acceleration and increased in extent on the time axis and on the log threshold luminance axis. Similar but less extensive and less reliable effects were produced by increasing pre-exposure duration. (Author's abstract)

6966

Foley, P. J.
LEGIBILITY OF MOVING DIGITS AS A FUNCTION OF THEIR SEPARATION AND DIRECTION OF MOVEMENT.—Defence Research Medical Labs. (Canada), Toronto, Ontario (DRML Project no. 76). DRML Report no. 76-4, Aug. 1957. v+5 p.
 AD 145 725 UNCLASSIFIED

The maximum speed of moving digits at which correct identification is possible has been investigated, and has been found to depend on the separation between digits, and the direction of movement. The greater the separation between digits, the greater the speed that can be tolerated. Horizontal movement is better than vertical movement. Movement from right to left is better than movement from left to right, and movement up is better than movement down. There is a significant interaction between direction of movement and the separation between digits. (Author's abstract)

6967

Fooks, G.,
 E. J. Sweeney, and F. L. Dimmick
PILOT STUDIES OF A SCOTOPIC SENSITIVITY TEST.—Naval Medical Research Lab., New London, Conn. (Project no NM 23 01 20, Report no. 1, Subtask 4). Report no. 285 (vol. 16, no. 7), June 14, 1957. iii+7 p.
 UNCLASSIFIED

Seven highly trained subjects with normal night vision and extensive experience in making psychophysical judgments served as observers in the investigation of a new scotopic sensitivity test which arrives at a representative picture by sampling a number of retinal locations. The results show (1) that the sensitivity scores correlate well with the psychophysical findings; (2) that significant individual differences exist in scotopic sensitivity; (3) that multiple stimuli do not produce any decrement in the sensitivity scores; and (4) that two testing sessions serve to differentiate individuals adequately.

6968

Gerathewohl, S. J.,
 H. Strughold, and W. F. Taylor
THE OCULOMOTRIC PATTERN OF CIRCULAR EYE MOVEMENTS DURING INCREASING SPEED OF ROTATION.—*Jour. Exper. Psychol.*, 53 (4): 249-256. April 1957. DLC (BF1.J6, v. 53)
 Essentially the same as item no. 5790, vol. V.

6969

Graefe, O.
[ANALYSIS OF THE INTERNAL STRUCTURE OF A FIGURE PERCEIVED IN THE PERIPHERAL FIELD OF VISION] Analyse des inneren Aufbaus einer im peripheren Gesichtsfeld wahrgenommenen Figur.—*Zeitschrift für experimentelle und angewandte Psychologie* (Göttingen), 4 (1): 104-136. [1957] In German, with English summary (p. 137). DNLM

A series of figures was exposed in the peripheral visual field to be reproduced in drawing. The analy-

sis of one such figure gave the following results: (1) Properties of a peripherally perceived figure appeared to be coarser, which affected context, order, and centralization; the number of qualities was reduced and the remaining ones rendered more clearly. (2) Dominating properties adhered more to the surface than to the contour; properties of the contour tended to disappear, whereas those of the surface became more dominant. (3) The center of the figure and the more peripheral parts of the field of vision appeared to have certain tendencies in common, namely, to attract figure parts of minor importance, to favor the development of new phenomena, and to render the existing properties of presence and form more undifferentiated. (Author's summary)

6970

Granger, G. W.,
 and C. M. Franks
DARK-ADAPTATION AND CONDITIONING: SOME OBSERVED CORRELATIONS.—*Amer. Jour. Psychol.*, 70 (3): 462-464. Sept. 1957.
 DLC (BF1.A5, v. 70)

The time interval required to detect a parafoveal test field presented at six luminance levels following light adaptation was compared with conditioned eyeblink and galvanic skin reflexes in 36-46 subjects. Positive correlations were found between length of perceptual time during dark adaptation and ease of conditioning and resistance to extinction of reflexes. It is suggested that both visual thresholds and conditioned reflexes reflect the excitability of the central nervous system.

6971

Granger, G. W.
LIGHT AND FORM THRESHOLDS DURING DARK-ADAPTATION.—*Acta ophthalmologica* (Copenhagen), 35 (4): 361-371. 1957. In English. DNLM

Following 5 minutes of light adaptation to a luminance of 1500 mL., parafoveal dark-adaptation curves were obtained for a circular test field and for a simple geometrical shape, each of 3° angular diameter, and exposed for 0.2 second. The adapting field and test stimuli were viewed through a 3-mm. artificial pupil. The dark-adaptation curve for "form perception", although of the same general shape as that for "light detection", was displaced upward along the log-luminance axis, the amount of displacement being about 1 log unit at the final "rod" threshold. Results are compared with those of other investigations, various discrepancies discussed, and a tentative explanation of some of the findings suggested in terms of a quantum theory of retinal organization. (Author's summary, modified)

6972

Greene, P. H.
FACTORS IN VISUAL ACUITY. I. NEURAL INHIBITION AND THE VISUAL PERCEPTION OF CONTOURS.—*Bull. Mathem. Biophysics*, 19 (2): 147-156. June 1957. DLC (QH505.A1B8, v. 19)

Interpretations of the mechanisms of perception of contours or of Mach bands have stressed either the role of various spatial derivatives of light intensity at the retina or the importance of various forms of inhibitory effects between neighboring retinal elements. Evidence is presented here in support of the latter type of interpretation. It is considered that the brightness contrast and perceived contours arise from neural elements, each of which is stimulated in proportion to the intensity of pho-

toreceptor excitation at a point of the retina and inhibited in proportion to the mean intensity in some neighborhood of that point. The role of the spatial derivatives is best seen as a particular manifestation of the inhibitory mechanism. Predictions based upon this hypothesis appear to be consistent with experimentally observed evidence. (Author's abstract)

6973

Gurevich, B. Kh.

[OCULAR ADJUSTMENT DUE TO MUSCULAR SENSITIVITY, AND THE POSSIBLE ROLE OF PROPRIOCEPTION IN VISUAL PERCEPTION]

Ob ustanovke glas na osnove myshechnogo chuvstva i o vozmozhnoi roli propriotseptsii v vizitel'noi fikatsii. — Doklady Akademii Nauk SSSR (Moskva) 115 (4): 829-832. Aug. 1957. In Russian.

DLC (AS362.83663, v. 115)

Eye movements in one direction in the absence of optical clues (in total darkness), and stabilisation of the visual axis in that direction can serve as a criterium for proprioceptive participation of the intrinsic muscles of the eye in visual fixation. Fixation of the eye is accompanied by a flow of impulses from the muscles into the proprioceptive centers, and the number of impulses depends on the frequency of changes of retinal images. There exists a well defined relationship between proprioceptive and oculomotor center activities to the point that proprioceptor impulses constitute a conditioned stimulus for the compensatory eye movement. Visual clues strengthen and stabilize the proprioceptive control of the eye.

6974

Hartline, H. K.,

and P. R. McDonald

THE FREQUENCY OF SEEING AT LOW ILLUMINATION. — Appendix C to M. H. Pirenne, F. H. C. Marriott, and E. F. O'Doherty, Individual differences in night-vision efficiency, p. 70-81. Medical Research Council (Gt. Brit.). Special Report Series no. 294, 1957. DLC (RE923.P5, 1957)

Frequency-of-seeing curves were obtained for five different visual tasks performed at low illumination: (1) seeing a flash of light, (2) distinguishing the orientation of a bright letter T subtending 3° at the eye, (3) same for a black 3° T (in a 6° field), (4) same for a grey 3° T (32 percent contrast), and (5) same for a black 1° T, using a group of 11 normal healthy subjects. The average curves so obtained may be taken as fairly representative of the frequency of seeing by normal subjects for these particular tasks. For a given routine of test procedure the standard error of the mean threshold can be computed from the frequency-of-seeing curve for each test.

6975

Heck, J.,

and I. Rendahl

COMPONENTS OF THE HUMAN ELECTRORETINOGRAM: AN ANALYSIS IN NORMAL EYES AND IN COLOUR BLINDNESS. PRELIMINARY REPORT. — Acta physiologica Scandinavica (Stockholm), 39 (2-3): 167-175. 1957. DNLM

On stimulation with strong flicker of equal light and dark intervals and 1 stimulus/sec., it has been found possible in man to obtain an electroretinogram (ERG) with two negative and four positive waves. In normal eyes, adaptation to red light leads to temporary dis-

appearance of the third positive wave, whereas pre-adaptation to green light enhances the 4th positive wave. The third, red-sensitive component was lacking in two protanopes. This component was present in the third protanope, but was not influenced by adaptation to red light. A deuteranope exhibited the ordinary ERG but, whereas adaptation to red light enhanced the third positive component in the usual way, the ERG was uninfluenced by adaptation to green light. One patient with deuteranomalopia had an ERG similar to that of normal eyes. In two totally color-blind patients, a photopic ERG was entirely lacking. The red-sensitive component is in agreement with experiences of the photopic ERG published earlier. The 4th positive wave is presumably a photopic function, although a specific green-sensitive component cannot be ruled out. Some properties of the two negative waves are briefly discussed. (Authors' summary)

6976

Heck, J.

THE FLICKER ELECTRORETINOGRAM OF THE HUMAN EYE. — Acta physiologica Scandinavica (Stockholm), 39 (2-3): 158-166. 1957. DNLM

An account is given of the human photopic flicker electroretinogram (ERG), and its different phases are analyzed. With rising flicker frequency, the amplitude initially diminishes owing to interference between the negative a-wave and the second positive off-effect making the ERG practically diphasic. With a further increase in flicker frequency, a considerably greater amplitude of response is recorded, owing to super-imposition of the off-effect on the b-wave. This is followed by a linear decrease in amplitude until fusion occurs. Slightly before fusion, the flicker ERG consists of an a-wave and first off-effect. The flicker fusion frequency is directly proportional to the logarithm of light intensity (Ferry-Porta law) up to 90-95 flashes/second. With an increase in light intensity above 2500 lux, the flicker fusion frequency once more diminishes. The different phases in the flicker ERG are discussed. It is suggested that the splitting of the b-wave and the off-effect can be explained by the presence of color components with different latency periods. (Author's summary)

6977

Heck, J.

[THE OFF-EFFECT IN THE HUMAN ELECTRORETINOGRAM] Der Off-Effekt im menschlichen Elektroretinogramm. — Acta physiologica Scandinavica (Stockholm), 40 (2-3): 113-120. 1957. In German. DNLM

After light-adaptation the human electroretinogram shows in response to flicker stimulation a doubled positive off-effect in addition to a complex on-response which corresponds to the single-stimulus ERG of congenitally night-blind subjects. "On" and "Off" behave in exactly inverse fashion. The dependency of the Off-effect from the state of adaptation and the light intensity is investigated and the appearance of its doubled configuration discussed. (Author's summary, modified)

6978

Heck, J.,

and W. Papst

[ON THE ORIGIN OF THE CORNEORETINAL RESTING POTENTIAL] Über den Ursprung des corneoretinalen Ruhepotentials. — Bibliotheca ophthal-

mologica (Basel), no. 48: 96-107. 1957. In German.

The corneoretinal resting potential was studied by electro-oculography in the rabbit during ischemia and recovery. Ischemia results in a disappearance of the EOG within 16 minutes. The EOG reappears after re-establishment of blood circulation whereby the recovery time depends on the duration of ischemia. The b-wave of the electroretinogram is less resistant than the EOG, which must reflect the different sites of origin within the retina. Disappearance of the EOG after selective destruction of the pigmented epithelium and its change in conditions of detachment of the retina and light and dark adaptation suggest as the primary site of the EOG the pigmented epithelium with some participation of the visual cells. During light adaptation the EOG rises slowly within 20-30 minutes and falls at the same rate during subsequent dark adaptation. The increase in potentials is proportional to the logarithm of the light intensity. It is concluded that the resting potentials may originate in the electrolyte metabolism of the pigmented epithelium and be directed by the visual cell.

6979

Helms, A.,

R. Krüger, and H. Strässner

[CHANGES IN SENSITIVITY OF THE DARK-ADAPTED HUMAN EYE IN MONOCULAR ADAPTATION] Empfindlichkeitsänderungen des dunkeladaptierten menschlichen Auges bei monocularer Adaptation.—Albrecht von Graefes Archiv für Ophthalmologie (Berlin), 159 (4): 369-370. 1957. In German. DNLM

Experiments permit the conclusion that light adaptation of one eye increases the sensitivity of the dark-adapted other eye in monocular vision. This sensitivity declines with progressive dark adaptation of the light-adapted eye.

6980

Hsia, Y.,

and C. H. Graham

SPECTRAL LUMINOSITY CURVES FOR PROTANOPIC, DEUTERANOPIC, AND NORMAL SUBJECTS. — Proc. Nat. Acad. Sci., 43 (11): 1011-1019. Nov. 1957. DLC (Q11.N26, v. 43)

Six deuteranopes, 5 protanopes, and 7 normal subjects were tested to investigate cone luminosity losses in subjects with deficient color vision. Each subject was dark-adapted for 10 minutes, and the test stimulus lasted for 4 milliseconds. Thresholds were determined for each wave length of each subject by a Maxwellian-type view system. Results showed that the protanopes are normal for the blue-green, but they lose luminosity at long wave lengths with a corresponding increase in energy requirements in the red part of the spectrum. The deuteranopes show normal luminosity in the red and a loss in the blue-green. These results do not support the hypothesis of a transformation system of the R- and G-receptors proposed by Leber and Fick because of the manner in which green sensitivity is lost in the deuteranopes.

6981

Iarbus, A. L.

[EYE MOVEMENTS ON CHANGING STATIONARY FIXATION POINTS IN SPACE] Dvizheniia glaz pri smene nepodviznykh tochek fiksatsii v prostranstve.—Biofizika (Moskva), 2 (6): 698-702. 1957. In

Russian, with English summary (p. 702).

DLC (QH505.A1B53, v. 2)

In transfer from one stationary fixation point to another which is not on the same mean axis, the eye motion consists of two independent movements, i.e., convergence or divergence and a stepwise movement. The change in convergence always occurs in such a way that the point of intersection of the axes moves along the mean eye line, the direction of the latter changing stepwise. In any such transfer the stepwise motion is preceded by a slight convergence or divergence which is of the same duration regardless of the size of the step or the separation in depth of the fixation points.

6982

Iarbus, A. L.

[ON THE PERCEPTION OF AN IMAGE STATIONARY WITH RESPECT TO THE RETINA] K voprosu o vospriiatii izobrazheniia, nepodvizhnogo otnositel'no setchatki.—Biofizika (Moskva), 2 (6): 703-712. 1957. In Russian, with English summary (p. 711-712).

DLC (QH505.A1B53, v. 2)

An empty visual field is a test field in which all apparent color differences have vanished. An empty field is produced by a state in the visual analyzer in which external information entering the eye and producing fixed stimuli with respect to the retina ceases to be transformed into a visual image within 1-3 seconds. The apparent color of the empty field is independent of the radiations falling on the part of the retina corresponding to the empty field, but may be altered by varying the experimental conditions. The state of the visual analyzer is markedly altered by continuing action of fixed stimuli after the appearance of the empty field. Two distinct processes occur in the visual analyzer: (1) a high-speed process in which all visible differences in the test field vanish, and (2) a slow process which can be detected through after-images. The first process lasts less than 3 seconds whereas the second takes several tens of seconds. Although the apparent color of a moving object on an empty-field background may vary widely, there is a tendency to maintain the difference between the object and the empty field.

6983

Korzun, P. A.

[CHANGES IN THE ELECTRICAL SENSITIVITY OF THE EYE AFTER ILLUMINATION WITH INTENSE FLASHES OF DIFFERENT COLORS] Izmeneniia elektricheskoi chuvstvitel'nosti glaza posle zasvetov intensivnymi vspyskami raznykh tsvetov.—Biofizika (Moskva), 2 (4): 431-440. 1957. In Russian, with English summary (p. 440). DLC (QH505.A1B53, v. 2)

The curve which represents the change in the electrical sensitivity of the eye as a function of time elapsed since cessation of illumination has a characteristic shape after a 2-second pre-illumination of the eye with light of low intensity. After illumination of the fovea centralis with red light, the maximum occurs after 1 second; after white and green light the maximum occurs after 2 seconds; and after blue light the maximum is reached in 3 seconds. The maxima are similarly distributed along the time axis after illumination of the peripheral retina with lights of different color. The characteristic positions of the maxima may be related to time differences in color perception. High-intensity flashes cause a significant fall instead of a rise in electrical activity of both sites. This fall is absent after red flashes,

which may be related to inhibitory processes in the visual analyzer. A second peak appears 6-7 seconds after illumination of the retinal periphery with low-intensity light through neutral or blue filters.

6984

Krauskopf, J.

EFFECT OF RETINAL IMAGE MOTION ON CONTRAST THRESHOLDS FOR MAINTAINED VISION.

— Jour. Optical Soc. Amer., 47 (8): 740-744.

Aug. 1957.

DLC (QC350.06, v. 47)

Contrast thresholds for maintained vision were determined under varying conditions of retinal image motion. The "stopped image" technique was used to eliminate normal image motion. Controlled motion at various frequencies and amplitudes was introduced by rotating one of the mirrors in the optical system. Low-frequency vibrations (1, 2, and 5 c.p.s.) of the retinal image were found to be beneficial to maintained vision while high-frequency vibrations (10, 20, and 50 c.p.s.) were found to be detrimental to maintained vision when compared to vision in the absence of normal retinal image motion. (Author's abstract)

6985

Kris, C.

DIURNAL VARIATIONS IN PERIORBITALLY MEASURED EYE POTENTIAL [Abstract].—Electroencephalography and Clinical Neurophysiol. (Montreal), 9 (2): 382. May 1957. DNLN

Periorbital recordings of eye potentials showed characteristic diurnal patterns of variation in potential level, velocity of eye motion, precision and regularity of target fixation, blink rate, binocular coordination, and liminal illumination threshold. The amplitude of the "eye calibration potential" accompanying the process of light adaptation varies with the time of day and the illumination level. A shorter, single-peaked dark adaptation was also found.

6986

Kuffler, S. W.,

R. Fitzhugh, and H. B. Barlow
MAINTAINED ACTIVITY IN THE CAT'S RETINA IN LIGHT AND DARKNESS.—Jour. Gen. Physiol. 40 (5): 683-702. May 1957. DCL (QP1.J73, v. 40)

Nervous activity has been recorded from the unopened eye of decerebrate cats, and recordings were made from ganglion cells or nerve fibers. Continuous maintained discharges were seen in all ganglion cells during constant illumination as well as in complete darkness. Technical factors have been excluded as a source of this activity. Visual stimuli are therefore transmitted by modulating the ever present background activity. No consistent patterns of discharge frequency were found, but the frequency could be altered by a change in illumination. A statistical analysis of the impulse intervals of the maintained discharge showed that the firing probability at any time depends on the times of occurrence of the two preceding impulses only, and in such a way as to indicate that each impulse is followed by a transient depression of excitability that outlasts the following impulse. (Author's abstract, modified). (34 references)

6987

Landahl, H. D.

ON THE INTERPRETATION OF THE EFFECT OF AREA ON THE CRITICAL FLICKER FREQUENCY.

— Bull. Mathem. Biophysics, 19 (2): 157-162. June 1957.

DLC (QH505.A1B8, v. 19)

The effects of area and intensity on the critical flicker frequency, threshold, and reaction time are considered in terms of neural net theory. An attempt is made to develop a mechanism which can account for the phenomena associated with the empirically observed laws of Ricco, Granit, Talbot, and Ferry-Porter as well as observations on reaction time and threshold. A simple model gives results which are substantially in agreement with observation except for a few apparent discrepancies. Experimental procedures are suggested which can determine whether these are apparent or real. (Author's abstract)

6988

Miller, J. W.

A REVIEW OF THE METHODS PREVIOUSLY EMPLOYED TO PRODUCE A HOMOGENEOUS VISUAL FIELD AND THE DESCRIPTION OF A NEWLY DEvised TECHNIQUE.—Kresge Eye Inst., Detroit, Michigan (Contract Nonr-586 (00)); issued by School of Aviation Medicine, Pensacola, Fla. (Project no. NM 17 01 99, Subtask 2). Report no. 14, Aug. 1, 1957, ii+10 p. AD 144 362 UNCLASSIFIED

A newly devised method for producing a homogeneous visual field is described. The apparatus consists of a double-walled, clear Plexiglas bell filled with a liquid fogging solution through which the observer views a uniformly illuminated white background containing no visible cues for accommodation. The liquid fog has the effect of obliterating all imperfections in the field, which results in producing a virtually unlimited homogeneous field. The apparatus permits manipulation of hue, saturation, brightness, and density of the whole visual field. Some of the problems that can be investigated with this technique are autokinesis in an illuminated field, detection of stationary and moving targets in a homogeneous field, empty field myopia, and the determination of the minimum perceptible velocity in a uniform field.

6989

Monnier, M.

[THE SPATIAL AND TEMPORAL STRUCTURE OF THE ELECTRIC RESPONSE OF THE CORTICAL VISUAL CENTER TO LIGHT STIMULI IN MAN INCLUDING THE MEASUREMENT OF THE RETINO-CORTICAL TIME] Die räumliche und zeitliche Struktur der elektrischen Antwort des kortikalen Sehzentrons auf Lichtreize beim Menschen einschliesslich der Messung der retino-kortikalen Zeit.—Bibliotheca ophthalmologica (Basel), no. 48: 15-24. 1957. In German. DNLN

Electrophysiological study of the functional organization of the human cerebral cortex employing surface electrodes placed on the occiput in a parasagittal arrangement reveals a spatially organized pattern of activity of the area striata 17 in response to light. The average retino-cortical latency, from the retinal impulse to the beginning of the b-component of the cortical-occipital response to light, was 10 ± 5 milliseconds in the normal subject.

6990

Mooney, C. M.

CLOSURE AS AFFECTED BY CONFIGURAL CLARITY AND CONTEXTUAL CONSISTENCY.—Canad. Jour. Psychol. (Toronto), 11 (2): 80-88. June 1957. DLC (BF1.C3, v. 11)

This study undertook to verify the proposition that scanning eye-movements are not involved in routine perception except in the supplementary elucidation of recognizable detail. Three experiments demonstrated that when compositional detail is suppressed, so that objects are implicatively represented only by their intrinsic forms, they are effectively perceived and distinguished, and that viewing time and scanning eye-movements are gratuitous except in verifying the incompatibility of the parts of false configurations. The general conclusion was that in mundane perception the stimulus-complex has unitary valence and effect; and that, if there are ordinal or sequential processes at work in perceptual occurrences, these are not essentially dependent on scanning eye-movements. (Author's summary)

6991

Mote, F. A.,

and L. M. Forbes

CHANGING PRE-EXPOSURE AND DARK ADAPTATION.—*Jour. Optical. Soc. Amer.*, 47 (4): 287-290. Apr. 1957. DLC (QC350.06, v. 47)

The dark adaptation of two subjects was measured after changing pre-exposures in a continuous manner from zero to the maximum intensity and from the maximum to zero. Three intensities (22.5-2250 mL) and four durations (0.5-4 minutes) were studied. Changing the pre-exposure from zero to maximum intensity resulted in higher initial thresholds and longer times to reach the final dark-adapted threshold than was the case when the pre-exposure was changed maximum to zero.

6992

Nolan, G. F.

ON THE FUNCTIONAL RELATION BETWEEN LUMINOUS ENERGY, TARGET SIZE, AND DURATION FOR FOVEAL STIMULI.—*Jour. Optical Soc. Amer.*, 47 (5): 394-397. May 1957. DCL (QC350.06, v. 47)

The data of previous authors are analyzed and re-evaluated in terms of luminous energy rather than luminance. Based upon the form of the resulting curves, the hypothesis is advanced that the energy requirements are determined by aberrations. Within the limits of the Bunsen-Roscoe law the retinal energy density is constant, and beyond this critical duration the retinal illuminance is a constant. Further uses of these relations are discussed. (Author's abstract, modified).

6993

Oswald, I.

AFTER-IMAGES FROM RETINA AND BRAIN.—*Quart. Jour. Exper. Psychol. (Cambridge)*, 9 (2): 88-100. May 1957. DLC (QP351.E95234, v. 9)

The evidence pointing to the retinal origin of after-images is considered. The reports of the occurrence of after-images from visual images of hallucinatory vividness are reviewed. Experimental results are presented to indicate that a complementarily colored after-image may arise following the exposure of the temporarily blind retina to a colored stimulus. After-images, or after-effects, from vivid images are described in 17 persons (mostly possessors of "number-forms" imagery). They are found to move with the eyes and to show, in some persons, a degree of conformity with Emmert's Law which, while considerable, is less than that of after-images of real stimuli. In the case of one "eidetic" subject,

the after-images from neither real nor imaged stimuli conformed with Emmert's Law. In some persons, after-images of images occur in complementary colors. The retinal origin of after-images is affirmed, but that they can occur occasionally as a purely central phenomenon is acknowledged. The possible learned or inherent nature of after-images of central origin is discussed. (Author's summary)

6994

Papst, W.,

and J. Heck

[THE IMPORTANCE OF THE GLYCOGEN CONTENT OF THE RETINA FOR ITS RECOVERY TIME] Die Bedeutung des Glykogengehalts der Netzhaut für ihre Wiederbelebungszeit.—*Bibliotheca ophthalmologica (Basel)*, no. 48: 196-201. 1957. In German. DNLM

Electroretinograms were employed to determine the retinal recovery time after intraocular ischemia of limited duration. The recovery time was shown to be a function of the duration of ischemia and of the amount of glycogen present in the retina. Hypoglycemia and ischemia are additive in their effect on the retina. The significant difference between the recovery times of the retina and the cerebral cortex that remains even after depletion of the retinal glycogen stores suggests that the low metabolism of the retina is responsible for the high resistance of the retinal cell to lack of oxygen.

6995

Pfeifer, H.

[INVESTIGATIONS OF THE EFFECT OF HELENEIN ON THE NORMAL AND LOWERED DARK ADAPTATION] Versuche über die Wirkung des Helenein auf die normale und herabgesetzte Dunkeladaptation.—*Albrecht von Graefes Archiv für Ophthalmologie (Berlin)*, 159 (3): 311-322. 1957. In German. DNLM

Administration of Helenein (a lutein dipalmitic acid ester obtained from flowers of *Tagetes patula flore-pleno*) to subjects with normal dark adaptation was without further effect on the dark adaptation threshold. In two subjects with disturbed dark adaptation due to myopia, Helenein improved dark adaptation slightly.

6996

Pinneo, L. R.

THE RADC VISUAL SENSITOMETER.—Rome Air Development Center, N. Y. Report no. RADC-TN-57-256, July 1957. iii+7 p. AD 131 185

PB 129 517

An apparatus is described, developed for the purpose of studying a wide range of visual problems. The Sensitometer provides the capability to investigate problems involving the reaction time of the human eye to light stimulation of a small physical area, the relationship between background or ambient illumination on perception of a target, and the differences in the responses of the human eye to color.

6997

Pirenne, M. H.,

F. H. C. Marriott, and E. F. O'Doherty
INDIVIDUAL DIFFERENCES IN NIGHT-VISION EFFICIENCY.—*Medical Research Council (Gt. Brit.). Special Report Series* no. 294, 1957. vii+83 p. DLC (RE923.P5, 1957)

Experiments are described which assess sensory acuity and perceptual efficiency by means of special-

ized visual tests administered at low illuminations to dark-adapted subjects. Without denying the general relevance of intellectual factors, it is concluded that, at the threshold of vision or near it, differences in perceptual efficiency between one individual and another arise mainly from differences in sensory acuity. The relationship of this finding to theory and practice is discussed. (57 references)

6998

Rizzo, P.

[STUDIES ON THE CHANGES OF THE CRITICAL FREQUENCY OF LIGHT STIMULI INDUCED BY INGESTION OF ETHYL ALCOHOL] Ricerche sulle modificazioni della frequenza critica degli stimoli luminosi indotte dall'ingestione di alcool etilico.—*Rivista di medicina aeronautica* (Roma), 20 (2): 249-261. April-June 1957. In Italian, with English summary (p. 258). DLC (RC1056.R56, v. 20)

Critical fusion frequency (CFF) was studied with a stroboscope in 20 normal subjects after the ingestion of a dose of 0.48 g./kg. of ethyl alcohol. Determinations were carried out every 5 minutes during an hour. The results showed a progressive decrease in CFF in the ascending phase of alcoholemia (first 15 minutes). After this period CFF remained unchanged, but showed greater variability after 25 minutes. Since sensory fusions may be modified by the lowest concentrations of alcoholemia, it is postulated that this phenomenon may be possible for CFF also. Cessation of the decrease after this period, in spite of the ascending phase of alcoholemia, is explained by an adaptation of the nervous elements. The increase in variability present during the entire ascending phase is attributed to a cortical action of alcohol, which especially affects attention. A comparison is made of the results with those possibly obtained in anoxia or local ischemia.

6999

Ronchi, L.,

and G. T. di Francia

ON THE RESPONSE OF THE HUMAN EYE TO LIGHT STIMULI PRESENTING A SPATIAL OR TEMPORAL GRADIENT OF LUMINANCE.—*Jour. Optical Soc. Amer.*, 47 (7): 639-642. July 1957.

DLC (QC350. O6, v. 47)

When a subject views two parallel luminous fields of different luminance separated by a transitional zone of gradually decreasing or increasing luminance, he perceives a bright line at the edge of the brighter and a dark line at the edge of the dimmer field. These lines are known as Mach bands. There is evidence that the cone mechanism is responsible for the vision of the Mach bands. It also appears from measurements in the peripheral retina and from electroretinographic investigations that the rods contribute to the sensation of higher brightness of the graded field. A possible relation is pointed out between the phenomena occurring in the vision of a field with a temporal gradient of luminance. (Authors' abstract, modified).

7000

Rushton, W. A. H.

BLUE LIGHT AND THE REGENERATION OF HUMAN RHODOPSIN IN SITU. — *Jour. Gen. Physiol.*, 41 (2): 419-428. Nov. 1957.

DLC (QP1.J73, v. 41)

Regeneration of rhodopsin was studied in vivo by analyzing the light reflected from the fundus oculi.

The effect of blue light on retinene isomerization from the all-trans isomer to the neo-b isomer was observed. By measuring the increase in rhodopsin after light irradiation of retinene, isomerization can be found to be dependent or not on blue light. The light used for bleaching had an intensity of 50,000 scotopic trolands, and the fixation period was 15-25 min. It appears that there is no effect of blue light upon regeneration of rhodopsin, and rhodopsin regeneration proceeds without retinene irradiation. A special apparatus for measuring rhodopsin intensity in situ is described.

7001

Schubert, G.

[FOVEAL BRIGHTNESS THRESHOLD AND SIMULTANEOUS CONTRAST] Foveale Helligkeitsschwelle und Simultankontrast.—*Albrecht von Graefes Archiv für Ophthalmologie* (Berlin), 159 (1): 60-65. 1957. In German. DNLM

Research on the effect of simultaneous contrast of a surrounding field involving parafoveal areas on the brightness threshold of fovea showed the following: (1) The effect of contrast is a function of the photopic system only. (2) If the raise in foveal threshold is chosen as a measure of the contrast effect K, the relationship to brightness of the surrounding field may be expressed by the following equation, $\log K = 0.6 \log I + a$. The contrast effect on the fovea is a result of the inhibitory processes in the synapse layer of the retina. (From the author's summary)

7002

Shimizu, S.

ON THE SEASONAL VARIATION OF FLICKER VALUE.—*Jour. Sci. and Labour* (Tokyo), 33 (12): 959-968. Dec. 1957. In Japanese, with English summary (p. 959). DNLM

Seasonal variations of flicker fusion frequency in men and women were observed by the sector-type flicker test apparatus in an air-conditioned room (18°-20° C.) throughout the year. The following results were obtained: (1) Declination ratios of flicker value by duty were relatively small, 2.8% for men and 2.7% for women; (2) flicker values changed parallel with temperature in the range from 15° C. to 22° C. but not above 22° C.; (3) flicker value was the highest in the most comfortable temperature range of 22°-24° C.; (4) hysteresis was not related to temperature and biological function; and (5) the constant thermal condition for 7 hours a day was not observed to eliminate the seasonal biological effect on the workers. (Author's summary, modified)

7003

Slivinske, A. J.,

and L. M. Crumley

THE EFFECTS OF CONTRAST, COLOR, AND VIEWING ILLUMINATION ON THE LEGIBILITY OF LETTERS AND NUMERALS.—*Pennsylvania State Univ., University Park* (Contract N156s-32041); issued by Naval Air Material Center. Air Crew Equipment Lab., Philadelphia, Pa. (Project no. TED NAM AE-7047, Part 16a). Report no. NAMC-ACEL-329, Feb. 27, 1957. 13 p. AD 129 107 PB 146 505

The effects are evaluated of contrast, color, and viewing illumination on the legibility of five letters and numerals (E, L, N, T, Y, 2, 4, 5, 7, 9) presented under three degrees of contrast (46.45, 15.30, 5.16), two values of color (white on black versus red on black), and under conditions of day viewing (30 foot-

candles) as opposed to night viewing (0.09 foot-candle). Subjects' read-out time served as the measure of legibility. Independent analysis of contrast and color under day and night viewing conditions failed to produce reliable results. However, when contrast, color, and viewing illumination were combined in a single analysis, viewing illumination was found to be reliably related to legibility—day viewing produced significantly shorter read-out times than the simulated night viewing conditions. An apparent practice effect occurred early in the series of trials, but this effect diminished rapidly with continuing stability of the legibility measures. (Authors' summary, modified)

7004

Smith, Stanley W.,
and F. L. Dammick

MEASUREMENT OF THE LIGHT ADAPTATION OF THE RODS.—*Jour. Optical Soc. Amer.*, 47 (5): 391-393. May 1957. DCL (QC350.O6, v. 47)

In order to confirm previous work on the length of time required to reach stable light adaptation, light conditions were maintained in three successive stages: (1) an initial period of darkness or high brightness for 30 minutes, (2) a critical period of high brightness for 1-21 minutes, and (3) the test period. Adaptation periods up to 20 minutes were required at the critical brightness level before the effects of the initial adaptation levels disappeared. After initial adaptation at high brightness, adaptation curves descend from high thresholds when critical adaptation is brief to a minimum curve when it is long. The direction is opposite when the initial adaptation is in darkness.

7005

Smith, William M.,
and L. J. Baranski

DYNAMIC CONTOUR PERCEPTION: STIMULUS SIZE AND ORIENTATION [Abstract].—*Amer. Psychologist*, 12 (7): 442. July 1957. DLC (BF1.A55, v. 12)

Perception of the contour of moving stimuli was investigated for stimulus sizes of 0.5, 3.0, and 6.0 degrees of angle and diagonal and vertical stimulus orientations. Ability to perceive contour was found to be a function of exposure duration of the stimulus in a fixed position prior to movement. Increasing size facilitated contour perception during movement, while stimulus orientation had no effect.

7006

Sorokhtin, G. N.,

M. S. Trusov, and M. L. Raev
[THE EFFECT OF ANTICHOLINESTERASE PREPARATIONS ON THE DARK ADAPTATION OF THE EYE] *Vliianie antikholinesteraznykh preparatov na temnovuiu adaptatsiu glaza.*—*Biulleten' eksperimental'noi biologii i meditsiny* (Moskva), 44 (12): 81-85. Dec. 1957. In Russian, with English summary (p. 85). DLC (R850.B55, v. 44)

The effect of eserine (Physostigminum salicylicum, Merck), prostigmine (Prostigminum, La Roche), and proserine (Proserinum, NIKHFI) on the dark adaptation and light sensitivity was studied in healthy adults. Investigations were carried out with three different types of adaptometers, including that of Nagel. Intramuscular injections of eserine solution (0.2-0.6 mg.) or prostigmine (0.15-0.3 mg.) accelerated dark adaptation and increased light sen-

sitivity of the eyes 1.5-3 times. This effect is stable and persists for 24 hours or longer and is expressed by a monophasic curve. The authors explain the above effect of various anticholinesterase preparations by increased mobilization of the synaptic acetylcholine in the retina, the genu capsulae internae and the corresponding projection zone in the cerebral cortex. (Authors' summary, modified)

7007

Sperling, H. G.,
and G. B. Lee

THE AREA-INTENSITY RELATIONSHIP AT THRESHOLD FOR THREE STIMULUS DURATIONS IN THE HUMAN FOVEA.—*Naval Medical Research Lab., New London, Conn.* (Project no. NM 22 01 20, Subtask 1, Report no. 1). Report no. 287 (vol. 16, no. 9), May 20, 1957. iii+6 p. AD 217 103

UNCLASSIFIED

The relationship of area and intensity functions for three stimulus durations in the human fovea were re-determined. Previous studies have disagreed as to the mathematical relationship which describes this function of the fovea. The findings seem to confirm Ricco's Law, indicating little or no spatial interaction of the one-degree fovea. Several reasons for the discrepancy with other recent findings are discussed, and further research is outlined. (Author's abstract)

7008

Stegemann, J.

[ON THE EFFECT OF SINUSOID CHANGES IN THE DENSITY OF LIGHT ON PUPIL WIDTH] Über den Einfluss sinusförmiger Leuchtdichteänderungen auf die Pupillenweite.—*Pflügers Archiv für die gesamte Physiologie* (Berlin), 264 (2): 113-122. 1957. In German. DLC (QP1.A63, v. 264)

The change in pupil width under sinusoid variations of light intensity was considered from the standpoint of a feed-back regulatory system. It was shown after a frequency analysis of the closed and open feed-back system which explored the amplitude and phase inter-relationships that pupil dilatation and constriction operates as a proportional feedback system. The control factor amounts to approximately 0.5, therefore changes in the illumination intensity of the retina are corrected only to 50%. The system is efficient up to 0.8 c.p.s. sinusoidal variations of intensity; however, at 0.8-2 c.p.s. the regulatory system becomes disordinated to the point that glare protection is seriously affected since almost nine times as much light impinges on the retina than expected with a rigid pupil. At frequencies above 2 c.p.s. the pupil becomes almost rigid.

7009

Stone, P. T.,
and K. G. Corkindale

SOME FACTORS AFFECTING THE EFFICIENCY OF VISION AT NIGHT.—*Ministry of Supply (Gt. Brit.). Directorate of Physiological and Biological Research. Clothing and Stores Experimental Establishment.* Report no. 88, Oct. 1957. ii+[19] p. AD 158 707.

UNCLASSIFIED

The literature is surveyed to bring together some of the many facts concerning night vision and the way it is affected by various environmental circumstances, and different conditions of the individual. The physiological processes underlying dark adaptation are outlined, together with the principles of dark adaptation measurement. Characteristics of certain stimu-

lous conditions as related to the rate and level of adaptation are discussed, i.e., the retinal area stimulated; the intensity and wavelength of the previous light. This is followed by an account of the way individual factors such as age, nutrition, oxygen and blood-sugar levels, carbon monoxide, alcohol, and local eye and clinical disorders affect night vision. Recommendations are made for the maintenance of optimum visual ability at night. Included are representative figures. (Authors' abstract, modified) (50 references)

7010

Tanaley, K.

SOME OBSERVATIONS ON MAMMALIAN CONE ELECTRORETINOGRAMS.—*Bibliotheca ophthalmologica* (Basel), no. 48: 7-14. 1957. In English.

DNLM

Electroretinograms of histologically pure cone mammalian retinas (squirrels: *Sciurus carolinensis leucotis*, and *Citellus citellus*) were compared with those of the mixed rod and cone retinas (human). The evidence suggests that the general slowing of the retinal response at low illuminations reflected by the long-drawn-out b-wave, the increase in latency, and the slower temporal summation in the cone retina must be due to changes in the functional organization of the retina rather than a change-over to another type of receptor.

7011

Ushakova, T. N.

[THE RELATIONSHIP BETWEEN SPEED OF VISUAL MOTOR REACTION AND SENSITIVITY TO LIGHT] O sootnoshenii vremeni sritel'no-dvigatel'nykh reaktsii i svetovoi chuvstvitel'nosti. — *Voprosy psikhologii* (Moskva), 3 (1): 97-106. Jan.-Feb. 1957. In Russian. DLC (BF8.R8V6, v. 3)

Experiments on human subjects have shown that the raising of visual perception thresholds is usually accompanied by prolongation of the latent periods of visual motor reaction, and vice versa. Differences in motor reactions during stimulation of the eye may be attributed to the location of light-sensitive elements on the retina. At greater concentrations of these elements, motor reactions are faster and vice versa. There is evidence of a functional relationship between light sensitivity and visual motor reaction.

7012

Westheimer, G.

ACCOMMODATION MEASUREMENTS IN EMPTY VISUAL FIELDS.—*Jour. Optical Soc. Amer.*, 47 (8): 714-718. Aug. 1957. DCL (QC350.O6, v. 47)

Accommodation was measured by flashing light signals of 0.05 sec. duration every 10 sec. for a period of 30-40 min. Optical systems for presenting an empty visual field and for measuring the accommodation are described. The response to a dark or a bright central field is one of fluctuation in the level of accommodation. The average level of fluctuation is about 1D, the major period of fluctuation lasting about 2 min.

7013

Wilkinson, F. R.

THE INITIAL PERCEPTION OF PULSES OF LIGHT.—*Jour. Psychol.*, 43 (2): 265-268. 1957. DLC (BF1.J67, v. 43)

A study was made of perceptive phenomena result-

ing from the repetitious presentation of a circular patch of light in a dark field at varying frequencies, intensities, and numbers of repetition. Even at low rates of pulsation, variation was observed in the brightness of flashes, with the first flash often brighter than the remainder. As frequency was increased, the number of observed flashes dropped below the number presented. The fusion frequency of trains of pulses was found to be positively related to the total number of pulses presented rather than to the intensity of flashes. The results support the "alternation-of-response" theory of flicker, according to which it becomes more probable, as the train of pulses is lengthened, that additional pulses will find pathways from retina to cortex which are capable of responding to stimulation.

c. Hearing

[Ear protectors under 10-b; Hearing tests under 8-f]

7014

Asher, J. W.,

L. A. Doty, T. D. Hanley, and M. D. Steer
AN INVESTIGATION OF MONAURAL AND BINAURAL AUDITORY DISCRIMINATION IN NOISE.—*Purdue Univ., Lafayette, Indiana* (Contract N6ori-104); issued by Naval Training Device Center, Port Washington, N. Y. (NAVTRADEVCCEN Project 20-F-8). Technical Report NAVTRADEVCCEN 104-2-49, Feb. 18, 1957. iii+8 p. AD 125 185

UNCLASSIFIED

The ability of subjects to hear words correctly under a background noise of 95 decibels for three listening conditions (right ear, left ear and both ears) was tested. The results showed that binaural listening was superior to monaural listening. No significant differences were found between comparisons of right and left ear listening. If these findings are supported under operational conditions, measures should be taken to insure that communications personnel wear both earphones while receiving messages.

7015

Burns, W.

NOISE AND ITS EFFECTS: PHYSIOLOGICAL ASPECTS.—*Proc. Roy. Soc. Med. (London)*, 50 (4): 222-225. April 1957. DLC (R35.R7, v. 50)

Some of the physiological processes underlying the reaction of the human ear to various kinds of acoustic stimuli are reviewed with particular emphasis on the cochlear microphonics (CM) and the action potential (AP) of the auditory nerve. It is found that CM is a reliable index of acoustic trauma, especially if it involves damage to the cochlea. However, for the study of transient effects following less intense auditory stimulation, the more sensitive and reliable AP provides a more suitable index.

7016

Deatherage, B. H.,

H. Davis, and D. H. Eldredge
PHYSIOLOGICAL EVIDENCE FOR THE MASKING OF LOW FREQUENCIES BY HIGH.—*Jour. Acoust. Soc. Amer.*, 29 (1): 132-137. Jan. 1957. DLC (QC221.A4, v. 29)

Observations were made on guinea pig with intracochlear electrodes. Successive waves of low-frequency stimulation set off well-synchronized volleys of action potentials (AP) as well as cochlear

microphonic (CM). The phenomenon of masking of a 500 c.p.s. tone pip was observed when a low-frequency band of noise, centered on 500 c.p.s., obscured the CM and masked the AP that resulted from the pip. At comparable levels of stimulation, a high-frequency band of noise centered on 6950 c.p.s. and having no appreciable energy in the 500 c.p.s. region did not mask. But, as the intensity of the high-frequency sound was raised to high levels, masking occurred. A random, low-frequency CM appeared in the apical region in addition to the expected high-frequency CM response in the basal turn. The ear responds nonlinearly to high-level noise and detects its envelope as random low frequencies of random amplitude. This anomalous masking is produced both by a band of noise and by a high-frequency tone which is amplitude-modulated by a low frequency. (Authors' abstract)

7017

Ehmer, R. H.

AUDITORY MASKING BY TONES AND BY BANDS OF NOISE [Abstract].—Amer. Psychologist, 12 (7): 424-425. Feb. 1957. DLC (BF1.A55, v. 12)

Narrow bands of noise were found to yield masking patterns similar to those of tones, except for the elimination of the effects of beats and combination tones. Noise bands produced greater masking effects in the octave containing the masking frequencies, but approximately followed the masking curve of tones at higher frequencies.

7018

Epstein, A.

and E. D. Schubert

REVERSIBLE AUDITORY FATIGUE RESULTING FROM EXPOSURE TO A PURE TONE. I.—A.M.A. Arch. Otolaryngol., 65 (2): 174-182. Feb. 1957. DLC (RF1.A7, v. 65)

Twenty-three young adults of normal hearing were used as subjects to determine the critical fatiguing intensity for a 4000 c.p.s. pure tone of a three-minute duration. It was found that a sensation level of 80 db. approximates a fatiguing level because at levels greater than 80 db. there was a change in the fatigue pattern marked by the amount of threshold shift and the recruitment factor. There was also a shift in the frequency of maximal fatigue from one-fourth to one-half octave above the stimulating tone frequency. No reversal in the direction of the slope of the recovery curves was found in any of the subjects. The recovery rate for each frequency shows an equivalent change for increasing levels of the fatiguing tone. (20 references)

7019

Gers[h]uni, G. V.

CONCERNING NEW METHODS OF THE MEASUREMENT OF HEARING IN MAN. — Jour. Acoust. Soc. Amer., 29 (1): 129-131. Jan. 1957. DLC (QC221.A4, v. 29)

This paper gives a description of methods of measurement of hearing based upon the use of other different responses to sound stimuli. A set of different conditioned responses was used (galvanic-skin reflexes, eyelid reflexes, electrocortical and oculomotor reactions). The data obtained by these methods show the following: (1) absolute auditory thresholds and difference limens for frequency and intensity of pure tones can be measured with

the same accuracy by these reactions as by verbal responses; (2) in certain cases conditioned reflexes subliminal to the verbal response in the range of 1 to 6 decibels may be detected; (3) changes of absolute sensitivity, attaining 25 to 30 decibels and dependent on the conditions under which the reactions take place, can be detected. (From the author's abstract)

7020

Gerashuni, G. V.

1957

[DISCRIMINATION OF COMPLEX STIMULI WITH INCREASING AMOUNT OF INFORMATION BY THE HUMAN AUDITORY ANALYZER] O razlichenii zvukovym analizatorom cheloveka slozhnykh razdrashenii s vozrastaiushchim kolichestvom informatsii. — Fiziologicheskii zhurnal SSSR (Moskva), 43 (11): 1086-1097. Nov. 1957. In Russian.

DLC (QP1.F57, v. 43)

An analysis was made of the discrimination of complex auditory signals of different qualities (pitch, puretone vs. noise) and quantities (intensity, duration, interruptions). Both absolute and differential thresholds of discrimination were studied, as well as the effect of training on the signal discrimination. Conclusions are drawn concerning the functions of biological analyzers.

7021

Goldstein, M. H.

NEUROPHYSIOLOGICAL REPRESENTATION OF COMPLEX AUDITORY STIMULI.—Massachusetts Inst. of Technology. Research Lab. of Electronics, Cambridge. Technical Report no. 323, Feb. 19, 1957. iv+73 p. AD 156 530 PB 145 131

Thresholds of the cat's cortical responses to transient tonal stimuli varied with tone frequency, so that tuning curves could be obtained for thresholds of a given cortical point as a function of frequency. Thresholds of cortical responses to repeated bursts of noise were obtained by this technique and were found to be independent of repetition rate. Thresholds could be raised by filtering from the noise the energy in the frequency range to which the point was most sensitive. The tonotopic organization of the auditory cortex is related, primarily, to the distribution of stimulus energy in the spectrum. The temporal representation of envelope repetition rate was studied for stimuli at low and moderate intensity levels. By using an electronic processing device that averages a large number of responses we detected synchrony to stimuli, with repetition rates up to 200/second in the cortical potentials from unanesthetized cats. In barbiturate-anesthetized cats evoked responses to stimuli, with repetition rates up to 100/second were detected. Some psychophysical data on the discrimination of envelope repetition rate of modulated stimuli are also presented. A mathematical representation of signals as a function of two variables—one related to spectral frequency, and the other related to envelope periodicity—is included.

7022

Harbold, G. J.

PITCH RATINGS OF VOICED AND WHISPERED VOWELS.—Ohio State Univ. Research Foundation, Columbus (Contract N6onr 22525); issued by Naval School of Aviation Medicine, Pensacola, Fla. (Project no. NM 180299, Subtask 1). Joint Project Report no. 67, Feb. 28, 1957. ii+8 p. UNCLASSIFIED

Listener judgments of voiced and whispered vowels were investigated to compare the relative pitch of voiced and whispered speech. The results indicate, at least for those vowels that showed significant differences, that tonality may not be the sole determinant of listeners' pitch judgments. A comparison of the rank orders of the present study and a rank order from a previous physical investigation provided further support to the hypothesis that the relative pitch of vowels is not independent of the vowel itself. (Author's summary)

7023

Harbold, G. J.,

and D. G. Doehring

A RATING SCALE MEASURE OF SPEECH DISTURBANCES THAT ACCOMPANY DELAYED SPEECH FEEDBACK.—Ohio State Univ. Research Foundation, Columbus (Contract N6onr 22525); issued by Naval School of Aviation Medicine, Pensacola, Fla. (Project no. NM 18 02 99, Subtask 1). Report no. 71, Dec. 3, 1957. iii+14 p. AD 159 483 UNCLASSIFIED

The rating scale technique was used to quantify speech disturbances that accompany delayed speech feedback, i.e., delayed side-tone. Fluency judgments of both delayed and non-delayed speech samples were obtained from three panels of judges. Measures of speech-rate and speech-level were also considered. The fluency ratings were found to be reliable. There was high correlation between fluency and speech-rate during the delayed speech condition. (Authors' abstract)

7024

Harris, J. D.

A SEARCH TOWARD THE PRIMARY AUDITORY ABILITIES.—Naval Medical Research Lab., New London, Conn. (Project no. NM 22 01 20.2.1). Memorandum Report no. 57-4, April 25, 1957. [14] p. UNCLASSIFIED

Some major developments in studies on auditory abilities (1900 to present) are discussed. The increased number of laboratories concerned with the psychology of music and audition and the application of the now familiar factor analysis technique have contributed to revitalize work along these lines. The fallacy is demonstrated of analyzing the psychologically meaningful content of auditory tests or tasks by adopting a mathematical model of stimulus. Initial pursuance of the task of building up reliable, factorially pure tests of wide variety will lead to preparedness to tackle the ultimate questions by appeals to the animal, to partially defective human ears, and to some future combination of the methods of Seashore, Thurstone, and Stevens.

7025

Hinchcliffe, R.

THRESHOLD CHANGES AT 4 KC/S PRODUCED BY BANDS OF NOISE.—Acta oto-laryngologica (Stockholm), 47 (6): 496-509. June 1957. DNLM

Studies were made on four young male adults of change in the auditory threshold at 4 Kc/second following relatively intense stimulation with narrow bands of noise. Under appropriate conditions of stimulation, all four subjects consistently showed a polyphasic or oscillatory form of recovery curve. In general, a fatiguing band with a lower cut-off frequency of 2 Kc/sec. and an upper cut-off of 3 Kc/sec., produced a diphasic response at a lower intensity than did other noise bands. Some remarks are made on the

deduction of a Damage Risk Criterion from data so obtained. (Author's summary)

7026

Hogenboom, W. P. H.,

and M. P. Lansberg

FUNCTIONAL MIDDLE- AND INNER EAR SCAR PROGNOSIS IN FLYING PERSONNEL.—Aeromedica acta (Boesterberg, Netherlands), 5: 241-249. 1956/57. In English. DNLM

A five year follow-up survey is presented of threshold audiograms of 276 pilots with healed middle ear defects, or inner ear and VIIIth nerve defects (caused by infection, trauma, allergy, or otherwise), manifested as high frequency dips. The results are at variance with the supposed predisposition of the scarred ear to acoustic trauma.

7027

Ingham, J. G.

THE EFFECT UPON MONAURAL SENSITIVITY OF CONTINUOUS STIMULATION OF THE OPPOSITE EAR.—Quart. Jour. Exper. Psychol. (Cambridge), 9 (1): 52-60. Feb. 1957. DLC (QP351.E95234, v. 9)

The threshold to a 1,000 c.p.s. tone presented to the left ear was measured whilst the right ear was under continuous stimulation by a 400 c.p.s. tone. Observations were made on different groups of subjects, under three stimulus conditions and two conditions of attention. Thresholds were found to increase with increasing intensities of the continuous tone. Attention to that part of the field associated with the continuous stimulus produced no significant change, whether the continuous stimulus was present or not. There were no significant after-effects during ten minutes following the end of the continuous stimulus, though the results suggested a slow decrease in threshold. Several explanations of the phenomenon are considered. Cross-hearing and the reflex contraction of the middle-ear muscles can be virtually excluded. Central inhibition or the central control of sensory end-organs can account for the results. A statistical hypothesis is also tenable. (Author's summary)

7028

Jerger, J. F.,

AUDITORY ADAPTATION.—School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 57-19, Jan. 1957. 9 p. AD 132 268 PB 128 471

Auditory adaptation was measured for pure tones over a wide range of frequencies and intensities by the median plane localization method. For a given intensity, increasing the frequency from 125 to 1000 c.p.s. increased both the initial rate and maximum amount of adaptation. Above 1000 c.p.s. further increase in frequency did not appreciably change the adaptation curves. For a given frequency, increasing the intensity of the fatiguing stimulus also increased both initial rate and maximum amount of adaptation. The function, relating adaptation in decibels to fatiguing intensity, was, in general, negatively accelerated. The duration of sustained stimulation at which adaptation reached a maximum value was related to both frequency and intensity. (Author's abstract)

7029

König, E.

EFFECT OF TIME ON PITCH DISCRIMINATION THRESHOLDS UNDER SEVERAL PSYCHOPHYSI-

CAL PROCEDURES: COMPARISON WITH INTENSITY DISCRIMINATION THRESHOLDS. — Jour. Acoust. Soc. Amer., 29 (5): 606-612. May 1957. DLC (QC221.A4, v. 29)

A study is presented of the effect of the inter-stimulus interval on pitch discrimination in cases of five different psychophysical procedures. All experiments were carried out at a constant sound level of about 40 decibels above threshold, the mean reference frequency being 1000 c.p.s. The listeners examined were five young men with normal hearing acuity between the ages of 20 and 30. From the experimental data it appears that, irrespective of the method used, the mean over-all performance of the subjects in pitch discrimination deteriorates only slightly as the interstimulus interval increases from 1.25 to 5 seconds. In order to stress the large discrepancies among the performance of the listeners, the data for each subject were reported with special care. The effect of stimulus duration on pitch discrimination is briefly discussed. (Author's abstract, modified)

7030

Lawrence, M.,
and P. A. Yantis
OVERSTIMULATION, FATIGUE, AND ONSET OF OVERLOAD IN THE NORMAL HUMAN EAR. — Jour. Acoust. Soc. Amer., 29 (2): 365-374. Feb. 1957. DLC (QC221.A4, v. 29)

The experiments reported here compare the shift in audibility threshold and in onset of overload following one-minute stimulations with a 1000-c.p.s. tone at sensation levels of 20, 60, 80, 90, 100, and 110 decibels. The amount of post-stimulus fatigue measured 6 seconds after cessation of the fatiguing tone showed little variation with intensity of fatiguing tone whereas the onset of overload, when compensation was made for fatigue of the harmonic frequency, showed a progressive lowering with increase of intensity of fatigue tone. It is concluded that within the limitations of these experimental conditions the fatigue measured is not a property of the sensory cells whose sensitivity does not change until an injurious level of tone is reached, but that overloading is a property of these cells and the lowering of its onset level reflects an increasing decrement in performance following increasing intensities of stimulation. (From the authors' abstract)

7031

Mendelson, E. S.
EFFECTS OF JET ENGINE AFTERBURNER NOISE: OBJECTIVE MEASUREMENT OF THE AUDITORY REFLEX IN MAN. — Naval Air Material Center. Air Crew Equipment Lab., Philadelphia, Pa. (Project NM 001062.05, Report no. 4). Report no. NAMC-ACEL-327, Feb. 12, 1957. iii+2 p. AD 123 219 UNCLASSIFIED

A method is described for studying an unfamiliar aspect of the auditory reflex. In some subjects, small but consistent muscular contractions may be demonstrated without resort to visual observations within the ear. The contractions were elicited by stimulation of one ear with loud tones, while recording very minute pressure changes from the external canal of the opposite ear. Further development of these observations may shed some light on the initial phase and specific nature of the auditory reflex response. The method is of physiological interest. It

may prove of diagnostic importance, for example if applied to the unsolved problem of distinguishing noise-susceptible ears of individuals out of a random population. (Author's abstract)

7032

Mendelson, E. S.
HUMAN MIDDLE EAR MUSCLE RESPONSE TO LOUD SOUNDS [Abstract]. — Physiologist, 1 (1): 60-61. Nov. 1957. DNLM

In an analysis of tympanic muscle reflexes, the manometric technique separately applied by Wojtasek (1908) and Mangold (1913) was tested independently in the present study. Twenty-five laboratory volunteers and 13 volunteer medical students were used in an attempt to develop a reliable, portable method. Using a sensitive pressure probe in the occluded external meatus, volumetric displacements up to about 0.5 cu. mm. were registered in ten of the subjects during contralateral airborne stimulation. Effective stimuli corresponded with those classically described as arousing the auditory reflex. (From the author's abstract)

7033

Misrahy, G. [A.],
E. Shinabarger, K. Hildreth, and W. Gannon
BIO-ELECTRIC STUDIES OF THE COCHLEA [Abstract]. — Federation Proceedings, 16 (1, part 1): 88. March 1957. DLC (QH301.F37, v. 16)

By means of a pair of stimulating electrodes placed in the cochlea of anesthetized guinea pigs, the action potential and D.C. potential of the scala media and resistance of the basilar membrane microphonics were studied. Destruction of the fourth, third, and second turn of the cochlea did not affect the D.C. potential or microphonics (1000 cycles) as recorded from the scala media through the round window. By measuring the potential drop produced by a constant current across the basilar membrane it was found that the resistance of this membrane was of the order of 500 ohms at the round window, 3500 at the first turn and 1000-1500 at the second turn. Loud sounds produce a disappearance of the action potential, microphonics, and D.C. potential. Just preceding or simultaneously with the drop in D.C. there was a drop in resistance of the basilar membrane. Recovery of the resistance preceded the recovery of the D.C. Breathing nitrogen first lowered the D.C. potential of the scala media then the resistance of the basilar membrane, and on returning the animal to air the D.C. potential was the first to recover. (Authors' abstract, modified)

7034

Misrahy, G. A.,
E. W. Shinabarger, and K. M. Hildreth
STUDIES ON FACTORS AFFECTING THE SUMMATING POTENTIAL. — Wright Air Development Center. Aero Medical Lab. Wright-Patterson Air Force Base, Ohio (Project no. 7210, Task no. 71733). WADC Technical Report no. 57-467, Aug. 1957. iv+16 p. AD 130 956 UNCLASSIFIED

The role that distortion within the cochlea, streaming of endo- or perilymph, and sensitivity of micro-electrodes to oxygen play in the genesis of the summing potential was studied. The most important factor appears to be mechanical distortion of the scala media. Any condition tending to increase distortion of the scala media lowers the threshold and

increases the amplitude of the summing potential at given sound levels. Conditions preventing distortion have the reverse effect. (Authors' abstract)

7035

Moser, H. M.,
and J. J. O'Neill
THE MASKING OF ENGLISH WORDS BY PROLONGED VOWEL SOUNDS.—Ohio State Univ. Research Foundation, Columbus (Contract AF 19(604)-1577); issued by Air Force Cambridge Research Center. Operational Applications Lab., Bolling Air Force Base, Washington, D. C. (Project no. RF 664) Technical Report no. 40, May 1957. iv+18 p. AD 110 080 UNCLASSIFIED

One hundred and ten monosyllabic words selected from the Thorndike list of 1000 most frequently occurring words in English to represent equally each of 10 vowels were presented to 300 American listeners in an articulation test. Also tested were 72 spondee words, half selected from those in use in audiological tests and half from those in frequent use in air traffic control, further to represent the same vowel sounds. Masking of the stimuli was accomplished by separately recording each of nine prolonged vowels intoned by a trio of male voices. Results indicate that vowels of equal sound pressure levels differ considerably in masking effectiveness, that words containing a specific vowel are not masked optimally by the same vowel, and that spondees are masked by prolonged vowels in the same rank order as are the monosyllables. Prolonged vowel sounds with relatively high concentrations of energy between 700 and 1000 c. p. s. are most effective as masking agents. Some observations on resistance of words to masking are made in relation to phonemic transition areas within words. (From the authors' summary)

7036

O'Neill, J. J.
A RESEARCH NOTE IN INTELLIGIBILITY UNDER VARIED LEVELS AND SPEECH-TO-NOISE RATIOS.—Ohio State Univ. Research Foundation, Columbus (Contract N6onr 22525); issued by Naval School of Aviation Medicine, Pensacola, Fla. (Project no. NM 18 02 99, Subtask 1), Report no. 72, Aug. 30, 1957. ii+8 p. AD 154 614 UNCLASSIFIED

The intelligibility of one type of speech material under seven speech-to-noise ratios (ranging from -15 to +15 db.) at each of six sound-pressure levels (50-100 db.) was investigated using 105 naval aviation cadets as subjects. As was expected, the higher speech-to-noise ratios were accompanied by higher intelligibility scores. The lowest level (50 db.) was, without exception, the optimal signal level. The similarities and differences of these results with those of other experimenters are discussed.

7037

Peters, R. W.
A RATING SCALE TECHNIQUE FOR THE MEASUREMENT OF SPEAKER INTELLIGIBILITY.—Ohio State Univ. Research Foundation, Columbus (Contract N6onr 22525); issued by Naval School of Aviation Medicine, Pensacola, Fla. (Joint Project no. NM 18 02 99, Subtask 1). Report no. 68, Feb. 8, 1957. iii+[12] p. UNCLASSIFIED

Measuring speaker intelligibility by listener ratings of voice samples on an equal-appearing intervals scale was evaluated for validity and reliability,

and the effect of different signal-to-noise ratios upon mean scale values were determined. The results indicate that a reasonable estimate of speaker intelligibility may be thus obtained. (Author's abstract)

7038

Shimizu, H.,
T. Konishi, and F. Nakamura
AN EXPERIMENTAL STUDY OF ADAPTATION AND FATIGUE OF COCHLEAR MICROPHONICS.—Acta oto-laryngologica (Stockholm), 47 (4): 358-363. April 1957. DNLM

The electric impedance between the perilymph and endolymph and the cochlear microphonics were measured after the ear of a guinea pig was stimulated by a loud sound for a short time and for a long time. The following results were obtained: (1) The electric impedance of the cochlear partition decreased following sound stimuli of high intensity and time was required to return to the pre-stimulatory condition after the termination of stimulation. (2) The cochlear microphonics decreases following long loud sound stimulation. (3) It was illustrated by an equivalent circuit that the mechanism of the auditory adaptation and fatigue in the cochlear partition is increase of ion diffusion on the hair cell membrane and decrease of electric charge of the cell membrane.

7039

Tolhurst, G. C.
DELAYED RESPONSE: EFFECTS UPON SPEECH RECEPTION AND SPEAKER INTELLIGIBILITY.—Ohio State Univ. Research Foundation, Columbus (Contract N6onr 22525); issued by Naval School of Aviation Medicine, Pensacola, Fla. (Project no. NM 18 02 99, Subtask 1). Report no. 74, Aug. 15, 1957. ii+15 p. AD 154 613 UNCLASSIFIED

Delaying written and/or verbal responses (zero to five seconds) resulted in progressive increases to the reception and intelligibility scores of multiple-choice intelligibility tests as well as to speaker intelligibility scores of PB (Phonetically Balanced) word tests. Five seconds response delay yielded the highest scores; however, one second delay gave the highest scores for PB listener reception. (Author's abstract)

7040

Tolhurst, G. C.
THE RELATIONSHIP OF SPEAKER INTELLIGIBILITY TO THE SOUND PRESSURE LEVEL OF CONTINUOUS NOISE ENVIRONMENTS OF VARIOUS SPECTRA AND OCTAVE-BAND WIDTHS.—Ohio State Univ. Research Foundation, Columbus (Contract N6onr 22525); issued by Naval School of Aviation Medicine, Pensacola, Fla. (Project no. NM 18 02 99, Subtask 1). Report no. 69, March 18, 1957. ii+13 p. AD 135 195 UNCLASSIFIED

The effects of 12 ambient noise spectra, six tilted and six octave-band noises, upon speaker intelligibility were studied as each spectrum was presented at six sound pressure levels through 125 db. Constant level recordings were made of 48 speakers in the noises and these were subsequently played back to panels of listeners. Highly significant differences affecting intelligibility were found among sound pressure levels for each type spectrum. Tilted spectra were different among each other at a highly significant level. Octave-band spectra differentially affected intelligibility at the 5 per cent level of confidence. (Author's abstract)

7041

Vinnikov, I. A.,
and L. K. Titova

[THE PRESENCE AND DISTRIBUTION OF ACID PHOSPHATASE IN THE ORGAN OF CORTI OF ANIMALS AT REST AND DURING SOUND STIMULATION] Nalichie i raspredeleniie kislotoi fosfatazy v kortievom organe zhivotnykh, nakhodiaschchikhsia v sostoianii otosital'nogo pokoiu i v usloviakh zvukovogo vozdeistviia.—Biulleten' eksperimental'noi biologii i meditsiny (Moskva), 44 (10): 60-63. Oct. 1957. In Russian, with English summary (p. 63). DLC (R850.B55, v. 44)

A spiral gradient of acid phosphatase distribution was discovered in the structural elements of the organ of Corti in animals (cats, rabbits, and guinea pigs) at relative rest. Low concentration of the enzyme was found in the superior (first) convolution of the cochlea. Its quantity increases gradually in the medial (second) convolution, while the highest concentration is found in the inferior (third) convolution. Exposure of the animals to high-frequency noise (1500 c.p.s., 95 db.) for one hour decreases the concentration of acid phosphatase in the hair cells of the inferior convolution of the cochlea. Stimulation with sounds of low frequency (300 c.p.s., 95 db.) decreases the acid phosphatase concentration in the cells of the superior convolution. Sound stimulation results also in a more variable concentration of acid phosphatase in certain neurons of the eighth ganglion, as well as in the neural fibers of the internal and external spiral network of the organ of Corti.

7042

Voitinakii, E. I. A.

[DIFFERENTIAL SENSITIVITY IN THE "ABSOLUTE" DISCRIMINATION OF A SERIES OF AUDITORY SIGNALS] Issledovanie differentsial'noi chuvstvitel'nosti v usloviakh "absolutnogo" razlichenia riada zvukovykh signalov.—Biofizika (Moskva), 2 (2): 147-153. 1957. In Russian, with English summary (p. 153).

English translation in: Biophysics (New York: Pergamon Press), 2 (2): 150-156. 1957.

The differential thresholds for frequency (pitch) established by the method of "absolute" discrimination of five signals, i.e., without a comparison standard signal, were considerably higher than those obtained in classical experiments on the physiology of hearing. An increase of the number of "absolutely" discriminated signals probably leads to an increase in the values of the differential thresholds. On approximation of the frequency of the sound signals, although there occurs a diminution of the quantity of information received, the thresholds are lowered and the frequency discrimination is finer. Training, arising in the course of the experiments, is a factor leading to an increase of accuracy of discrimination. (Author's conclusions, modified)

d. Proprioception (incl. Vestibular Functions)

7043

Cawthorne, T.

THE VESTIBULAR STIMULUS AND ITS EFFECT.—Practica oto-rhino-laryngologica (Basel), 19 (8): 498-502. Nov. 1957. In English. DNLM

Caloric and rotatory stimuli commonly employed

in the clinical examination of the vestibular system are sufficiently mild to evoke only the vestibular response without any of the undesirable side-effects. In this they may be regarded as the minimal effective stimuli of the vestibular end organ. Tests employing small quantities of ice-cold water are properly classed as maximal stimulation for a minimal duration of time. In regard to hyper- versus hyposensitivity of the vestibular end organ, the author considers the former to be due to a reduction of control by the central nervous system normally exercised over the peripheral response rather than an increased sensitivity of the end organ. (From the author's summary)

7044

Groen, J. J.

THE SEMICIRCULAR CANAL SYSTEM OF THE ORGANS OF EQUILIBRIUM. II.—Physics in Med. and Biol. (London), 1 (3): 225-242. Jan. 1957.

DLC (QH505.P47, v. 1)

A theory of central inhibition is proposed to explain the discrepancy in adapted "normal" people between the predicted mechanical behavior of the semicircular canal system as a heavily damped torsion pendulum and the stimulus reactions of nystagmus and sensations of motion. It is suggested that a central inhibition of the frequency of action potentials from one neuron to the next is effected either by the withholding of an essential chemical substance necessary for the transmission of a signal at a synapse, or by administration of an overdose of a chemical substance which would normally counterbalance the chemical process of transmission. It is concluded that a comparison of the distortion of nystagmus and the more significantly inhibited sensation reaction under central control may yield information on the function or dysfunction of the vestibular tract.

7045

Guedry, F. E.,

and G. Richmond

DIFFERENCES IN RESPONSE LATENCY WITH DIFFERENT MAGNITUDE ANGULAR ACCELERATION.—Army Medical Research Lab., Fort Knox, Ky. (USAMRL Project no. 6-95-20-001). Report no. 301, Feb. 28, 1957. ii+8 p. AD 146 281 UNCLASSIFIED

Fifteen subjects received a series of 8 angular accelerations during each of 5 sessions. They were required to signal onset of apparent rotation as quickly as possible. The interval between onset of acceleration and the subject's signal of apparent rotation, termed response latency, bears an inverse relationship to magnitude of angular acceleration. This relationship appears very systematic in all subjects in spite of fairly large differences between some individuals in the magnitude of their responses. Discrepancies between the obtained results and predictions, derived from theoretical mechanics of the semicircular canals, are discussed. (Authors' abstract)

7046

Haan, P. de

LABYRINTHINE REFLEXES DURING THE IMMINENCE OF A FALL.—Acta oto-laryngologica (Stockholm), 47 (2): 123-133. Feb. 1957. In English. DNLM

A series of body reflexes were examined in human subjects by means of an imminent fall technique. After a survey of the labyrinthine anatomy an attempt

is made to correlate the reflexes to a change in position and motion with their respective origin in distinct parts of the labyrinth.

7047

Kogan, A. D.

[EXPERIMENTAL DATA ON THE DISORDERS OF THE VESTIBULAR-VEGETATIVE REACTIONS] Eksperimental'nye dannye o mekhanizme narusheniia vestibulo-vegetativnykh reakttsii. — Vestnik oto-rino-laringologii, 19 (1): 52-59. 1957. In Russian, with English summary (p. 59). DLC (RF1.V4, v. 19)

The author studied the reflexes of the respiratory and cardiovascular systems in rabbits subjected to rotation or to electric stimulation of the vestibular apparatus. In intact animals the stimulation increased the respiratory rate, while respiratory amplitude and blood pressure either increased or decreased. The stronger the stimulus the greater was the effect.

7048

Mygind, S. H.

THE ANATOMICAL VARIATIONS OF THE LABYRINTH AND THEIR RELATION TO THE STATIC DEMANDS IN THE DIFFERENT ANIMAL SPECIES. — Practica oto-rhino-laryngologica (Basel), 19 (6): 565-569. Nov. 1957. In English. DNLM

In a series of vertebrates, the size and form of the labyrinth and its subdivisions have been studied and compared to the differences in the way of living and, particularly, of locomotion of the various animals. Certain conclusions are reached about the functions of individual parts of the labyrinth. (Author's summary, modified)

7049

Trincker, D.

[THE RESTING POTENTIALS IN THE SEMICIRCULAR CANAL SYSTEM OF THE GUINEA PIG AND THEIR CHANGES DURING EXPERIMENTAL DISTORTIONS OF THE CUPULA] Bestandspotentiale im Bogengangssystem des Meerschweinchens und ihre Änderungen bei experimentellen Cupula-Ablenkungen. — Pflügers Archiv für die gesamte Physiologie (Berlin), 264 (4): 251-382. 1957. In German. DLC (QP1.A63, v. 264)

Resting potentials were measured within the semicircular canals, ampullae, endolymph, surface of the cupula, and crista ampullaris. Changes in the potential during experimental deflection of the cupula were as follows: The maximum resting potential is shifted to the outside of the cupula; at the same time certain changes in the potential appear depending upon the direction of the deflection. During quantitatively graded deflections potential changes were (a) depolarization (excitation) brought about by utriculopetal deflections of the cupula in the horizontal ampulla and by utriculofugal deflections of the cupula in the anterior vertical ampulla, (b) a hyperpolarization (inhibition) resulting from utriculopetal distortion of the cupula in the horizontal ampulla and by utriculopetal distortions in the anterior vertical ampulla. In the crista extensive variations in the resting potential were correlated with more intense deflections of the cilia of sensory cells. Plotting of changes in the resting potential as a function of the degree of distortion of cupula in either direction give an S-shaped curve with a steeply rising midsection corresponding to the physiologi-

cally important area of low degrees of deflection (up to 35°). 105 references.

e. Complex Perceptive Phenomena (Including Spatial Orientation, Sensory Illusions, etc.)

7050

Ades, H. W.,

A. Graybiel, S. N. Morrill, G. C. Tolhurst, and J. I. Niven

NYSTAGMUS ELICITED BY HIGH INTENSITY SOUND. — Univ. of Texas. Southwestern Medical School, Dallas; and Naval School of Aviation Medicine, Pensacola, Fla. (Joint Project no. NM 13 01 99, Subtask 2). Report no. 6, Feb. 15, 1957. 11+21 p.

UNCLASSIFIED

In order to study some of the extra-auditory effects of loud noise, deaf subjects were stimulated by high-intensity sound, both pure tone of several frequencies (100-3000 c.p.s.) and wide-band noise. In those showing positive response to vestibular stimulation in one or more standard tests, nystagmus was a regular consequence when the noise was of a sufficiently high intensity. Dizziness and apparent movement in the visual field were in some cases regular concomitants of nystagmus, in others, less consistent. (Authors' abstract)

7051

Attneave, F.

PHYSICAL DETERMINANTS OF THE JUDGED COMPLEXITY OF SHAPES. — Jour. Exper. Psychol., 53 (4): 221-227. April 1957.

DLC (BF1.J6, v. 53)

Subjects made judgments of the complexity of shapes constructed so that certain physical characteristics were systematically varied and the remainder randomly determined. About 90% of the variance of ratings was explained by (a) the number of independent turns (angles or curves) in the contour, (b) symmetry (symmetrical shapes were judged more complex than asymmetrical shapes with the number of independent turns constant, but less complex with the total number of turns constant), and (c) the arithmetic mean of algebraic differences, in degrees, between successive turns in the contour. No significant difference in judgments was produced by the curvedness of shapes (angular, curved, or mixed) or the grain of the matrix from which critical points were chosen to construct the shapes. (Author's summary, modified)

7052

Beritov, I. S.

1957

[SPATIAL PROJECTION OF PERCEIVED OBJECTS INTO THE ENVIRONMENT BY MEANS OF LABYRINTHINE RECEPTORS] O prostranstvennom proetsirovani vospriniatykh ob'ektov vo vnesnei srede posredstvom labirintnykh retseptorov. — Fiziologicheskii zhurnal SSSR (Moskva), 43 (7): 600-610. July 1957. In Russian, with English summary (p. 610). DLC (QP1.F57, v. 43)

Spatial orientation was studied in freely moving cats and dogs. A definite impression of their environment, embodying an image of the location of vitally important objects, may be formed in these

animals without any visual stimuli. When animals approach these objects, their various sense organs perceptions are also accompanied by the excitation of labyrinthine receptors. Thus the locations of such objects are referred by the animal to definite points in its environment. Moving in a straight line for a definite time period results in the perception of the distance covered; turning at a definite angle excites the labyrinthine receptors in a special way. This results in the projection of those objects to definite sites within the animal's environment. Blindfolded animals move among the objects, previously projected to their perception, by means of the same physiological mechanisms that control their movements when their sense organs are immediately acted upon by these objects. (Author's summary, modified)

7053

Boynton, R. M.,

and W. R. Bush

LABORATORY STUDIES PERTAINING TO VISUAL AIR RECONNAISSANCE. — Univ. of Rochester, New York (Contract AF 33(616)-2565); issued by Wright Air Development Center, Aero Medical Lab., Wright-Patterson Air Force Base, Ohio (Project no. 7157). WADC Technical Report no. 55-304, Part 2, April 1957. v+48 p. AD 118 250 UNCLASSIFIED

Experiments were conducted to determine the effects of certain variables on the ability of human subjects to detect and correctly identify a rectilinear form among a group of curvilinear forms. Results are presented as per cent of correct recognition (i.e., correctly identifying a "target"), although some data for detection and error responses are also given. Recognition is found to increase with (1) increased contrast, (2) decreased distance, (3) decreased number of figures, and (4) increased exposure time but does not significantly change with either (a) response tendencies, or (b) experience with arrays. Both detection and errors are affected by response tendencies. Conclusions from this research and some consideration of further experimentation are presented. (Authors' abstract, modified)

7054

Cibis, P. A.,

and S. J. Geräthewohl

[EXPERIMENTAL INVESTIGATIONS OF SPACE PERCEPTION. II. DEPTH PERCEPTION IN MONOCULAR AND BINOCULAR VISION] Experimentelle Untersuchungen zur Raumwahrnehmung. II. Die Tiefenwahrnehmung bei monokularem und binokularem Sehen. — Zeitschrift für experimentelle und angewandte Psychologie (Göttingen), 4 (1): 84-93. [1957] In German, with English summary (p. 92).

DNLM

Experimental analysis of factors involved in depth perception showed the following to be of greater importance: (1) Linear perspective, as the most important factor in depth localization, was mediated, in descending order of importance by (a) horizontal contours, (b) horizontal coarse configuration, (c) vertical coarse configuration, and (d) irregular fine texture of the test surface. (2) Binocular parallax, as the next important factor, corresponded in its effects to the strongest component of linear perspective. The combined effect of binocular parallax and any of the perspective components was smaller than the sum of the effects of the individual factors concerned. Movement per se was not considered a genuine factor in

depth perception. To effect the so-called movement parallax, mere movement of an object was not sufficient. Lack of reference points decreased the correctness of localization of the object moving in space. The total effect of all factors was not equal to the sum of the individual factors. It depended on the respective combinations of the effective factors and their components. (Authors' summary, modified)

7055

Cohen, W.,

and D. Tepas

THE EFFECTS OF ADAPTATION UPON JUDGMENTS OF VERTICALITY [Abstract]. — Amer. Psychologist, 12 (7): 418. July 1957. DLC (BF1.A55, v. 12)

A study was made of the extent of dependence upon a tilted frame as a function of duration of exposure. Subjects continuously exposed to the frame were found to be more dependent upon the frame than were subjects remaining in the dark for the same time interval. No difference in dependence was found for exposure times of 8 or 16 minutes.

7056

Comalli, P. E.,

H. Werner, and S. Wapner

STUDIES IN PHYSIOGNOMIC PERCEPTION. III. EFFECT OF DIRECTIONAL DYNAMICS AND MEANING-INDUCED SETS ON AUTOKINETIC MOTIONS. — Jour. Psychol., 43 (2): 289-299. 1957. DLC (BF1.J67, v. 43)

The predominant direction of autokinetic motion was determined for each of three figures having left-right directional dynamics (a running horse, a running boy, and an arrow). Measures based on first reports of the direction of motion and on the duration of motion in any direction during 30 seconds of observation revealed that autokinetic motion was predominantly in the direction of the dynamics of the displayed figure. No difference was observed between upward and downward motion. To test the effects of differences in retinal distribution of the figures, identical ambiguous figures were presented for which left or right directional dynamics were dependent on information given (a bird flying left or an airplane flying right). The predominant direction of autokinetic motion was found to be dependent on directional meaning set. The effect of meaning set was also demonstrated with an ambiguous figure having upward or downward dynamics (a parachute or a balloon). For up-down figure dynamics, no left-right differences were observed in the direction of autokinetic motion.

7057

Conklin, J. E.

THE INFLUENCE OF FIGURAL INSPECTION ON THE AUTOKINETIC ILLUSION. — Amer. Jour. Psychol., 70 (3): 395-402. Sept. 1957.

DLC (BF1.A5, v. 70)

Experiments were conducted to determine the effect of cortical satiation produced by inspection for one minute of figures varying in size, shape, orientation, and filled or unfilled condition on subsequent perception of the autokinetic illusion. Quantitative measures of the direction, latency, rate, and displacement of autokinetic movement revealed no relation with inspection-figure variables. It is concluded that retinal events rather

than cortical satiation are predominant in the production of the illusion.

7058

Doesschate, G. Ten,
and J. T. van Weeren
[DETERMINATION OF THE BINOCULAR CAPACITY
FOR DEPTH DISCRIMINATION] Het meten van het
binoculaire diepte-onderscheidingsvermogen.—
Aeromedica acta (Soesterberg, Netherlands), 5: 381-
395. 1956/57. In Dutch, with English summary
(p. 390). DNLN

Two methods of measurement of depth discrimination by means of the three-rod apparatus are described and experimentally compared. Two subjects were used. One subject showed a statistically significant improvement with extensive practice. No such results were obtained with the second subject. Distribution of errors did not follow the normal distribution curve (Gauss) contrary to expectations. A possible explanation for this deviation is offered.

7059

[AN EFFECT OF FLIGHT AT VERY HIGH ALTITUDES:
THE BREAK-OFF OR SENSATION OF SEPARATION
FROM THE EARTH] Un effet du vol aux très grandes
altitudes: le break-off ou sensation de séparation du
globe terrestre.—*Force aérienne, Service de santé*,
Bulletin technique d'information [Bruxelles], 1957
(Aug.): 9-10. In French. DNLN

The break-off phenomenon is a condition of spatial orientation in which the pilot has the sensation of being isolated, detached, and physically separated from the earth. Out of 137 jet pilots interviewed, 35% declared that break-off was most frequently associated with either solo high-altitude flight, or high-altitude flight in which the pilot had a minimum of activity. Number of flying hours or specific altitude had no effect on break-off. In some pilots (38%) it was accompanied by euphoria or anxiety. Break-off disappears easily when the pilot descends to a lower altitude.

7060

Fukuda, T.,
and T. Tokita
[ON THE RELATION OF THE DIRECTION OF OPTICAL
STIMULI TO THE TYPES OF OPTICAL AND
SKELETAL MUSCLE REFLEXES] Über die Beziehung
der Richtung der optischen Reize zu den Reflextypen
der Augen- und Skelettmuskeln.—*Acta oto-laryngo-*
logica (Stockholm), 48 (4): 415-424. Oct. 1957. In
German. DNLN

Experiments subjecting rabbits, guinea pigs, dogs, cats, and men to rotary optical stimulation (in a cylinder with vertical black stripes) show: (1) In binocular vision the visual nystagmus is always present after visual stimulation regardless of the direction of stimulation and the species employed; (2) With monocular vision the response is more complicated and differs with the species depending upon the relative amount of nerve fibers crossing from the optic nerve at the chiasma.

7061

Gerathewohl, S. J.,
and P. A. Cibilis
SURFACE TEXTURE AND DEPTH PERCEPTION.—
School of Aviation Medicine, Randolph Air Force
Base, Tex. Report no. 57-24, April 1957. 10 p.
AD 140 943 UNCLASSIFIED

Experiments on the role of irregular texture for depth perception were made using a plate-stereometer to measure true and apparent differences as well as the effect of illumination upon spatial localization. The results obtained with two groups of ten subjects indicate that the accuracy of spatial localization of plane-parallel visual surfaces depends upon the perception of separate texture elements, i.e., grain size, grain density, and distribution and distinctness of reference points within the surface pattern. Surfaces with coarse and distinct grain seen at a bright illumination provided the greatest accuracy of spatial discrimination; but even the microstructure of surface texture improved depth perception when the grit density, grain size, and the conditions under which it is observed furnished transverse disparity and stereoptic cues. (Authors' abstract)

7062

Gibson, J. J.,
Olin W. Smith, A. Steinschneider, and C. W. Johnson
THE RELATIVE ACCURACY OF VISUAL PERCEPTION
OF MOTION DURING FIXATION AND PURSUIT.—*Amer. Jour. Psychol.*, 70 (1): 64-68. March
1957. DLC (BF1.A5, v. 70)

An experiment was conducted to determine the relative accuracy of motion perception by fixation of the eyes on some part of the stationary environment, or by fixation of the eyes on the moving object itself (pursuit). Subjects were required to match the speed of two patterned surfaces moving across two windows placed at a visual angle of 70°, by each of the two methods of perception. No significant difference in matching errors was found between the two methods of perception.

7063

Gogel, W. C.
PERCEIVED FRONTAL SIZE AS A DETERMINER OF
PERCEIVED STEREOSCOPIC DEPTH.—Army Medical
Research Lab., Fort Knox, Ky. (USAMRL Project
no. 6-95-20-001). Report no. 296, Sept. 3, 1957.
ii+21 p. AD 144 109 UNCLASSIFIED

An investigation is made of the process by which a stereopsis extent is perceived as a linear depth extent. In an experiment involving different frontal sizes of the same familiar object, the perceived depth resulting from a stereopsis extent increased as the retinal size of the familiar objects decreased. This result cannot be explained by a change in the perceived absolute distance of the familiar objects. An equation was developed for predicting the apparent depth extent associated with a stereopsis extent as a function of (1) an observer constant and (2) the ratio of the perceived to the retinal size of frontal extents in the vicinity of the stereopsis. (Author's abstract)

7064

Gogel, W. C.,
B. O. Hartman, and G. S. Harker
THE RETINAL SIZE OF A FAMILIAR OBJECT AS
A DETERMINER OF APPARENT DISTANCE.—
Psychol. Monographs, 71 (13): 1-16. 1957.
DLC (BF1.P8, v. 71)

Same as the report, item no. 5623, vol. V.

7065

Goldstein, A. G.
JUDGMENTS OF VISUAL VELOCITY AS A FUNCTION
OF LENGTH OF OBSERVATION TIME. —

Jour. Exper. Psychol., 54 (6): 457-461. Dec. 1957.
DLC (BF1.J6, v. 54)

Same as item no. 5625, vol. V.

7066

Gottsdanker, R. M.,
and R. V. Edwards
THE PREDICTION OF COLLISION.—Amer. Jour.
Psychol., 70 (1):110-113. March 1957.

DLC (BF1.A5, v. 70)

A modified tracking-box was used to display two targets which moved along perpendicular paths and disappeared into a simulated cloud before reaching a point of intersection. Subjects were required to judge where the variable target would be at the instant the standard target reached the intersection. It was found that predictions made by six of the ten subjects were based upon final relative positions of the targets immediately before disappearance, rather than upon their velocities or accelerations. In four subjects, no consistency was found for the predictions.

7067

Hake, H. W.

CONTRIBUTIONS OF PSYCHOLOGY TO THE STUDY OF PATTERN VISION.—Johns Hopkins Univ., Baltimore, Md. (Contract AF 33(616)-2918); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio (Project no. 7192-71598). WADC Technical Report no. 57-621, Oct. 1957. iv+118 p. AD 142 035 PB 131 626

A survey is provided of major research topics in psychology having relevance to patterned vision—including the study of threshold measurements, visual distortion, form discrimination, constancy in form perception, memory for form, and training problems. An analysis of the perceptual task suggests that true fidelity in visual perception is not possible, but that the visual system does operate to produce coherent reconstructions of visual stimulation. A bibliography of 332 references is included. (Author's abstract)

7068

Harcum, E. R.,
and A. Rabe

RECOGNITION OF LINEAR BINARY PATTERNS AT THIRTY-SIX ORIENTATIONS IN THE VISUAL FIELD [Abstract].—Amer. Psychologist, 12 (7): 441. July 1957.
DLC (BF1.A55, v. 12)

Linear patterns of filled and open circles were presented tachistoscopically at horizontal, vertical, and diagonal inclinations either symmetrically about fixation or about eccentric points in eight directions from fixation. Average recognition errors for the four inclinations were found to differ according to target location. Targets falling along lines passing through fixation gave poorest recognition for the vertical and best for the horizontal inclination.

7069

Jenkin, N.

EFFECTS OF VARIED DISTANCE ON SHORT-RANGE SIZE JUDGMENTS.—Jour. Exper. Psychol., 54 (5): 327-331. Nov. 1957.

DLC (BF1.J6, v. 54)

Subjects made comparison judgments of the size of squares placed at 2 or 10 feet from the eyes relative to a 4-inch square placed at a distance of 20 feet. Judgments at 2-foot distance were found to

be significantly larger than those at the 10-foot distance, while judgments at 10 feet were close to the physical size of the standard. Prior comparison judgments of equidistant stimuli at 10 feet had no effect on size estimation: at 20/10 feet or 20/2 feet.

7070

Juan Vallente, F. de

[VERTIGO CAUSED BY INSTRUMENTS] Vértigo de Instrumentos.—Revista de aeronáutica (Madrid), 17 (204): 881-884. Nov. 1957. In Spanish.

DLC (TL504.R516, v. 17)

Aircraft accidents attributed to vertigo in the pilot may be caused by instrument flight. Vertigo is of interest to the pilot for reasons of safety, to the flight surgeon who must determine its causes, and to the aircraft engineer who is concerned with adaptation of the plane to the pilot. Pilots believe that vertigo is due to lack of confidence in the instruments during flight, insufficient training, psychophysiological factors, and external, environmental causes. On the whole, the causes of vertigo during instrument flight are not well determined. It is postulated that since there is a correlation between vision and the proprioceptive system of equilibrium, any lack of stimulation from both systems can cause vertigo.

7071

Kris, C.

SIMULTANEOUS MEASUREMENT OF REFLEXLY ORGANIZED PROPRIOCEPTIVE (VESTIBULAR AND NECK) AND VISUAL (OPTOKINETIC) NYSTAGMUS SHOWING DOMINANCE OF THE VISUALLY EVOKED RESPONSE [Abstract].—Electroencephalography and Clinical Neurophysiol. (Montreal), 9 (3): 568. Aug. 1957. DNLM

After prior rotation of the subject in a Barany chair, the head alone was rotated through an arc of 180° from left to right and vice versa. Differences between both directions of rotation in the amplitude, frequency, and rate of nystagmus were established in control sessions (a) with eyes closed, (b) with eyes open, and (c) in a stationary black and white striped drum. Then the drum was rotated at various speeds. When the drum was rotating in the same direction and speed as the head (relative angular velocity, 0) nystagmus disappeared entirely. When the head was rotated in the opposite direction to the drum, the nystagmus was accelerated by an amount proportional to the rate at which stripes were moving relative to the subject's head. It is concluded that visual field controlled stimulation dominates—in its influence on the ocular nystagmus—over the vestibular and neck oculomotor reflexes, when the rate of nystagmus produced by head and body rotation alone is compared to the rate recorded when optokinetic response is added to the visual stimulus.

7072

Kylstra, J.

AUTOKINESIA.—Aeromedica acta (Soesterberg, Netherlands), 5: 261-269. 1956/57. In English.

DNLM

Autokinetic phenomena were investigated in groups of young men with and without flying experience and in a few older pilots. Each subject fixated on a light projected on the wall in a dark room and registered its movements by a rudderstick control. The findings were: (1) a latency time varying from seconds to minutes precedes the movement; (2) wide individual

differences exist in susceptibility to the illusion; (3) presentation of two or more light spots simultaneously diminishes the illusion; (4) there is no correlation between susceptibility to illusion and anomalies of refraction or heterophoria; (5) average amplitude of movement was 10°. Labyrinthine stimulation, caloric, auditory, or electric, affected the direction of displacement. Practical application of these findings to aircraft accident prevention is discussed.

7073

Lansberg, M. P.

SOURCES OF ERROR IN ELECTRONYSTAGMOGRAPHY.—*Aeromedica acta* (Soesterberg, Netherlands), 5: 251-260. 1956/57. In English. DNLM

Electronystagmographic recording of labyrinthine reactions may be contaminated by the following variables: (1) source of electricity, (2) lead placements, (3) recording apparatus, (4) direction of the gaze, (5) amplitude of eye movements, and (6) closure of eyes.

7074

Margarita, R.,

M. Manzotti, and G. Milic-Emili

[SENSITIVITY OF THE OTOLITHIC APPARATUS] La sensibilità dell'apparato otolitico.—*Bollettino della Società italiana di biologia sperimentale* (Napoli), 33 (10-11): 1634-1636. Oct.-Nov. 1957. In Italian. DNLM

Blindfolded persons subjected to the force of gravity while submerged in water exhibited a capacity for defining the vertical position better in some positions than in others. When the head was found in the vertical position after being in the horizontal position, the error in determining position was relatively small with a standard deviation of ± 3 minutes. When the head was down, with the body axis more or less inclined towards the vertical, the possibility of error was greater, ± 12 minutes. These results indicate that the sensation of position perceived by the otoliths is essentially good regardless of body position.

7075

Müller, K.

[ON VISUALLY PERCEIVED SPEED OF MOVEMENTS IN THE SAGITTAL PLANE] Über visuell wahrgenommene Geschwindigkeit sagittal gerichteter Bewegungen.—*Zeitschrift für experimentelle und angewandte Psychologie* (Göttingen), 4 (2): 307-318. [1957] In German, with English summary (p. 317). DNLM

Judgment of movement "towards" and "away" from the observer was analyzed. In estimating the velocity of two sagittal movements the "away" movement appeared to be the fastest. Given an objective movement of 43.5 cm./sec. the mean error of judgment was 25%. Differences between movements increased with decreasing visual control of conditions (line of movement, illumination, spatial structure). Comparing sagittal with horizontal-frontal parallel movement, the "towards" type of the former appeared faster and the "away" type slower than the objectively equally fast horizontal movement. Comparing sagittal and vertical movements, the latter were found to appear faster. Differences between a vertical movement and a "towards" sagittal movement were largest, with a judgment error of 38%. (Author's summary)

7076

Murray, J. E.

DEPTH PERCEPTION IN A STEREOSCOPIC DIS-

PLAY AS A FUNCTION OF NUMBER OF STIMULI, DEPTH RANGE, AND NUMBER OF SCALE MARKERS.—*Jour. Applied Psychol.*, 41 (6): 414-418. Dec. 1957. DLC (BF1.J55, v. 41)

Depth discrimination of dots presented stereoscopically was tested under conditions in which subjects ranked dots in order of depth or specified the actual depth of dots in space. Analysis of time and error scores revealed that accuracy was significantly decreased by increases in the number of dots presented when ranking of depth-levels was required, but not when assignment of specific depths was required. The time required to complete the task was increased as the number of dots was increased in both conditions. Increases in depth range increased accuracy of performance in both tasks, and improved time scores when ranking of depth levels was required. Both error and time totals were increased as the number of scale markers was decreased.

7077

Piercy, M.

EXPERIMENTAL DISORIENTATION IN THE HORIZONTAL PLANE.—*Quart. Jour. Exper. Psychol.* (Cambridge), 9 (2): 65-77. May 1957. DLC (QP351.E95234, v. 9)

Twenty-eight subjects were examined on a visual matching task for their ability to maintain an orientation with respect to a particular direction in the horizontal plane following a voluntary rotary body movement through 180 degrees. Each subject was examined for eight different directions. Numerous gross errors occurred when visual information was reduced to the display of an arrow indicating a direction and a second arrow manipulated by the subject. The magnitude and distribution of the errors suggest that visual information as to the direction in the horizontal plane is analyzed according to the two horizontal dimensions defined by the sagittal and coronal planes of the head. In correcting for the rotary body movement, failure may occur with respect to either or both of these two dimensions. The frequency of 180° errors is consistent with independent failure in each of the two horizontal dimensions. Failure is markedly more frequent in the fore-aft dimension than in the left-right dimension. When minimal "landmarks" are provided they tend to be utilized as reference points, even when the subject is aware that they are misleading. The relevance of these results to normal human orientation is discussed. (Author's summary, modified)

7078

Pivotti, G.

[EXPERIMENTS ON LATERAL NYSTAGMUS EVOKED BY SIMULTANEOUS BILATERAL THERMAL STIMULATION OF THE VESTIBULAR APPARATUS] Esperienze sul nistagmo laterale evocato da bilaterale, contemporanea stimolazione termica del apparato vestibolare.—*Archivio di fisiologia* (Firenze), 57 (2-3): 117-135. Nov 12, 1957. In Italian, with English summary (p. 133-134). DNLM

No lateral nystagmus was observed in normal subjects in a supine position with the head in a symmetrical position (corresponding to a horizontal situation in relation to the force of gravity of the plane connecting the ampullae of the horizontal semicircular canals) exposed to bilateral, simultaneous, equal thermal stimulation of the vestibular apparatus. This is termed the position of indifference. In this position, if the head was turned either right or left,

nystagmus developed directed towards the side contrary to rotation. The duration and frequency of the nystagmus attains maximal values after a 90° lateral rotation of the head. In this position, after a certain period of time, even if thermal stimulation persists, lateral nystagmus terminates. This may be due to exhaustion of the endolymphatic current with return of the cupula to its original position. By bringing the head back in the medial position (rotation of 90° in the direction contrary to the preceding one) nystagmus reappears. This is an expression of the endolymphatic current of balance that reinstates the original equilibrium. (Author's summary, modified)

7079

Rock, I.,

and W. Helmer

THE EFFECT OF RETINAL AND PHENOMENAL ORIENTATION ON THE PERCEPTION OF FORM.—*Amer. Jour. Psychol.*, 70 (4): 493-511. Dec. 1957.

DLC (BF1.A5, v. 70)

A series of experiments was conducted to determine the effects of 90° tilting of the head or of test figures on the recognition of previously-presented figures. When subjects were upright, tilting of familiar forms had no effect on recognition, but when subjects were tilted the upright figures were recognized more frequently than tilted figures. Thus environmental orientation apparently influenced the appearance of forms, while retinal orientation did not. When complex fragmented forms were used, upright figures were more easily recognized with subjects tilted or untilted. When subjects were told which portion of a complex figure was its top, however, tilted figures were more readily recognized by tilted subjects than upright figures, indicating a significant effect of retinal orientation. When figures were viewed in a horizontal plane to eliminate the factor of environmental uprightness, subjects imposed a phenomenal orientation based upon head position, so that disorientation of the figure had the same detrimental effect on recognition as a retinal and environmental tilt. Form perception is concluded to be due to phenomenal orientation of the figure (regardless of environmental orientation) and in some cases to retinal orientation. The latter effect is attributed to inadequate retinal communication with the appropriate trace (first presentation) of complex figures.

7080

Skramlik, E. v.

[ON THE GAIT STRAIGHT FORWARD] Über den Gang gradeaus.—*Zeitschrift für Biologie (München)*, 109 (6): 440-457. 1957. In German, with English summary (p. 456).

DNLM

The gait of persons walking on an even plane with closed eyes was investigated while the head was in the normal or in one of the six extreme secondary positions. Rotating the head in the direction to the right or the left shoulder resulted regularly in deviations from the direction of walking to the side to which the head was rotated or inclined. (Author's summary)

7081

Smith, Olin W.,

and Patricia C. Smith

INTERACTION EFFECTS IN JUDGEMENTS OF CURVATURE.—*Cornell Univ., Ithaca, N. Y. (Con-*

tract Nonr 401(14)) [Unnumbered Report], March 1957. 26 p. AD 123 674

UNCLASSIFIED

The interaction of a number of spots (3 levels) upon the surface of a demi-cylinder in the presence or absence of binocular disparity was studied at two distances. Form transformation and linear perspective "cues" were minimized (except in the statistical sense) as were brightness differences, interposition, and other monocular effects. On the basis of free reports of what was seen as well as on judgments of degrees of curvature on a standard scale of curvature, a greater curvature was found in binocular than in monocular vision and at the nearer distance of view. Monocular curvature was slight, ambiguous in direction, and insensitive to differences in number of surface elements present. An increase in number of surface elements (spots) was accompanied by reports of greater curvature at both distances of view. (Authors' summary, modified)

7082

Smith, Olin W.,

and L. Sherlock

A NEW EXPLANATION OF THE VELOCITY-TRANSPOSITION PHENOMENON.—*Amer. Jour. Psychol.*, 70 (1): 102-105. March 1957.

DLC (BF1.A5, v. 70)

An experiment was conducted to determine the role of frequency of moving objects in judgments of apparent velocity in which one moving field is twice the size of another. Subjects were required to match the frequency, double the frequency, or match the physical velocity of a belt covered by 1/2-inch stripes relative to a standard-velocity belt covered by 1-inch stripes. The belts were placed at an equal distance from the subjects, but the 1/2-inch-striped field was half the size of the 1-inch striped field. Subjects were able to perform the first two tasks with a high degree of accuracy. When instructed to regard the smaller-lined belt as being at twice the distance of the larger-lined belt in making matches of physical velocity, subjects made matches of apparent velocity which were approximately half the actual velocity of the standard. It is hypothesized that the frequency of moving objects rather than the dimensions of moving fields is the determining factor in judgments of apparent velocity.

7083

Squires, P. C.

STEREO-DISTANCE IDENTIFICATION.—*Naval Medical Research Lab., New London, Conn. (Project no. NM 22 02 20, Subtask 2, Report no. 2.) Report no. 286 (vol. 16, no. 8), May 22, 1957. iii+3 p.*

UNCLASSIFIED

Seven prospective observers failed to qualify for experiments testing ability to learn to make distance identifications in the stereoscope and haploscope under conditions which eliminate empirical clues and motives. One of the two observers who did qualify committed only three errors out of 120 test observations using a five-step scale of apparent distance in a haploscope under darkroom conditions; this same observer, after fifteen days between his third and fourth (final) sittings, made only one error out of forty observations. Neither observer was at any time in error by more than one apparent distance step. The importance of these facts to human engineering in connection with the problem of three-dimensional displays is discussed. (Author's abstract, modified)

7084

Sutton, J.

DECEPTION RIDES THE SKYWAYS.—Flying Safety, 13 (6): 2-5. June 1957. DLC (UG633.F43, v. 13)

In general, most sensory illusions occurring in pilots during high altitude flight are due either to accelerations which produce inner ear effects, to the absence or reduction of cues in the visual field, or to a combination of these conditions. Fatigue and emotion (primarily fear) intensify illusory disorientation and add to general disruption in pilot performance. Visual illusions appear to be less common than non-visual illusions but are no less dangerous. They occur because visual cues are misinterpreted—conditions favored by night and weather formation, lost horizons, and dim and unflickering lights pinned against dark unstructured backgrounds. The autokinetic illusion involving attitude and motion develops under instrument-flight conditions or when the visual field is reduced or unstructured. Another illusion, the oculogravic effect, involves both apparent motion and body displacement. Training aids for pilots are recommended so that they better understand the origin of illusory sensations and learn to act accordingly when these appear.

7085

Venger, L. A.

[THE MECHANISM UNDERLYING THE FORMATION OF GRAVITY AND SIZE ILLUSIONS] O mekhanizme vozniknoveniia illiuzii tiazhesti i velichiny. — Voprosy psikhologii (Moskva), 3 (1): 88-96. Jan.-Feb. 1957. In Russian.

DLC (BF8.R8V6, v. 3)

Illusions in weight and size perception, observed after repeated visual stimulation, with regard to two objects of different size and weight were related to position and color of the objects as well as to their absolute weight and size. They could be correlated with previous training.

7086

Wodak, E.

[ON THE PHYSIOLOGICAL BASES OF MOVEMENT ILLUSIONS OF VESTIBULAR AND NON-VESTIBULAR ORIGIN] Über die physiologischen Grundlagen der vestibulär und nichtvestibulär bedingten Bewegungstäuschungen.—Practica oto-rhino-laryngologica (Basel), 19 (1): 34-37. Jan. 1957. In German, with English summary (p. 37). DNLN

An analysis of vestibular (rotation test) and non-vestibular (optokinetic nystagmus) vertigo showed that the same phenomena were operating as in Bárány's pointing test: (a) changes in orientation of the body in relation to space (subjective sensation), and (b) induced tonic reflexes of all striated muscles including the muscles of the eye (nystagmus). These tonic reflexes can be demonstrated not only in vestibular vertigo but also in non-vestibular conditions. (Author's summary).

f. Psychomotor and Neuromuscular Performance and Responses (Including Reaction Time)

7087

Alluisi, E. A.,

P. F. Muller, and P. M. Fitts

AN INFORMATION ANALYSIS OF VERBAL AND

MOTOR RESPONSES IN A FORCED-PACED SERIAL TASK. — Jour. Exper. Psychol., 53 (3): 153-158. March 1957. DLC (BF1.J6, v. 53)

An experiment was conducted to determine the effects of rate of stimulus presentation and uncertainty per stimulus on the rate of information transmission in a forced-paced serial task. The task required verbal or motor responses to Arabic-numeral stimuli presented within the ranges of 1-3 bits/stimulus and 1-3 stimuli/second. For a given rate of information presentation, information transmission was increased by increases in the number of possible alternative stimuli. With increases in stimulus-presentation rate, information transmission was increased with verbal responses, but decreased with motor responses. Over-all performance with verbal responses was markedly superior to that with motor-responses. It is concluded that important effects are produced in forced-paced serial tasks by the interactions of stimulus complexity with stimulus rate, and stimulus code with response mode (subject-response compatibility).

7088

Anderson, N. S.

FACTORS OF MOTOR SKILL LEARNING AS A FUNCTION OF CONTROL LOADING [Abstract].—Amer. Psychologist, 12 (7): 425. July 1957.

DLC (BF1.A55, v. 12)

Twelve measures of performance were made for a compensatory tracking task involving four tracking controls with different spring and mass characteristics. Factor analysis of intercorrelations under the four conditions revealed a general accuracy factor and several factors identified with experimental task variations.

7089

Annett, J.,

and H. Kay

KNOWLEDGE OF RESULTS AND 'SKILLED PERFORMANCE'.—Occupational Psychol. (London), 31 (2): 69-79. April 1957. DLC (T58.A2N35, v. 31)

An outline is presented of an approach to skilled performance and its bearing upon how knowledge of results can be examined. It is apparent that knowledge of results may be used in a variety of ways and the trainer will have to be clear about these if he desires to introduce them. Where knowledge of results is introduced it is most likely that the trainee will attempt to use this augmented feedback but it is certain that how he uses it will vary from one kind of task to another and even within that task from one stage of training to another. Summaries of these points are presented in a series of general statements. These are not intended as dogmatic assertions but as postulates which may be verified and accepted or rejected as necessary. (From the authors' summary and conclusions)

7090

Arkad'evskii, A. A.,

A. P. Bruzhes, and E. A. Mukhamedova

[ON DISTURBANCES OF MUSCLE COORDINATION IN HIGH MOUNTAIN CONDITIONS] O narusheniakh koordinatsii dvizhenii v vysokogornnykh usloviyakh. — Biofizika (Moskva), 2 (2): 242-251. 1957. In Russian, with English summary (p. 251).

DLC (QH505.A1B53, v. 2)

English translation in: *Biofizika* (New York: Pergamon Press), 2 (2): 239-248. 1957.

DLC (QH505.A1B54, v. 2)

Coordination disturbances were found in 75% of 60 subjects investigated on the second day of a stay at 4,200 m. altitude (after 3-15 days of previous adaptation to 2,200 m. altitude). Slight residual effects persisted in 18 subjects studied on the fifth day. The disturbances consisted of overshooting the range in simple flexing movements, uneven speed of movement, and absence of correction in complex movements (in drawing lines, circles, and writing). The latency of the simple motor response was increased in 91% and the maximum rate of motion simultaneously reduced in 61% of the subjects. Symptoms of excitation and discoordination in the higher cortical centres included euphoria, faulty associations, emotional disturbances, etc. The symptoms are interpreted as resulting from inhibition of the motor analyzer through negative induction from the excited higher cortical centers.

7091

Battig, W. F.,

E. H. Nagel, J. F. Voss, and W. J. Brogden
TRANSFER AND RETENTION OF BIDIMENSIONAL
COMPENSATORY TRACKING AFTER EXTENDED
PRACTICE. — *Amer. Jour. Psychol.*, 70 (1): 75-
80. March 1957. DLC (BF1.A5, v. 70)

Acquisition of bidimensional tracking with high error-magnification was measured by integrated error for azimuth and elevation and by time-on-target with four subjects for 100 practice sessions. Asymptotic performance for all measures was obtained by approximately the eightieth sessions. The error-curves showed the same form and the time-on-target curve was the inverse of the error-curves. Positive transfer was found for the new course provided by reversing the course-cam and high negative transfer was found for reversal of control-direction. Retention of the skill by three of the subjects after 227 days of no practice was found to be very high. (Authors' summary)

7092

Bell, H.

EFFECT OF EXPERIMENTALLY INDUCED MUS-
CULAR TENSION AND FREQUENCY OF MOTIVA-
TIONAL INSTRUCTIONS ON PURSUIT ROTOR
PERFORMANCE [Abstract]. — *Amer. Psychologist*,
12 (7): 452. July 1957. DLC (BF1.A55, v. 12)

Subjects were required to hold a 0, 5, or 10 lb. dumbbell in the nonpreferred hand while performing a rotary pursuit task. Motivational instructions were introduced at varying time intervals. Analysis of variance of performance scores revealed slight, but not significant effects attributable to the interactions of muscular tension and frequency of instructions.

7093

Bennett, W. F.

AUTOCORRELATION AND CROSSCORRELATION
ANALYSES OF TRACKING BEHAVIOR [Abstract]. —
Amer. Psychologist, 12 (7): 451. July 1957.
DLC (BF1.A55, v. 12)

A study was made of three measures of tracking performance derived from graphic autocorrelation and crosscorrelation functions of tracking behavior. Both pursuit and compensatory displays were tested with random and periodic target courses. All meas-

ures were found to differentiate tracking behavior in terms of frequency and phase characteristics.

7094

Bersh, P. J.,

J. M. Notterman, and W. N. Schoenfeld
THE EFFICIENCY OF PURSUIT-ROTOR PERFORM-
ANCE DURING EXPERIMENTALLY INDUCED
ANXIETY. — *Columbia Univ. Dept. of Psychology*,
New York, N. Y.; issued by School of Aviation
Medicine, Randolph Air Force Base, Tex. Report
no. 57-28, April 1957. 6 p. AD 140 626

UNCLASSIFIED

An experiment is reported in which simultaneous records were kept of heart rate conditioned response (CR) and pursuit-rotor performance during the conditioned stimulus-unconditioned stimulus interval in a trace conditioning procedure designed to establish experimental "stress". It was found that: (1) Pursuit-rotor performance (as measured by percent of total trace interval time on target) was lower during the conditioning (tone-shock) phase, than during either basal or extinction (tone-alone) phases. (2) Magnitude of heart CR was directly correlated with successful maintenance of time on target scores during the tone-shock phase. (Authors' summary)

7095

Bilodeau, E. A.

PATTERNS OF INTERNAL CONSISTENCY IN
MULTIPART SKILLED PERFORMANCE. — *Amer.*
Jour. Psychol., 70 (4): 550-559. Dec. 1957.

DLC (BF1.A5, v. 70)

An attempt was made to define the functional relationships between parts of a task and the total task when the number of parts was varied. Time on target was measured for each of 1-4 pointers in a multidimensional pursuit task performed by one experienced subject. Correlations were found to be large in analyses in which either the multiplicative rule of independent probabilities was used to estimate the probability of the joint occurrence of scoring in two or more parts, or an estimate was made of the regression of part scores upon the total score. Analyses of the contribution of variance of part-scores to the total test-scores revealed that part-scores tended to correlate weakly with each other, but that each part contributed a considerable amount to the variance in total-scores. It is concluded that the methods and findings of the study should prove useful in the construction of a theoretical model for complex psychomotor skills.

7096

Bilodeau, E. A.

THE RELATIONSHIP BETWEEN A RELATIVELY
COMPLEX MOTOR SKILL AND ITS COMPONENTS.
— *Amer. Jour. Psychol.*, 70 (1): 49-55. March 1957.
DLC (BF1.A5, v. 70)

An attempt was made to establish a mathematical relationship between scores of unskilled subjects on a one-hand tracking task and scores on a related two-hand task. Two-hand performance was predicted by additive combinations of one-hand scores, on the basis of geometric relationships characterizing the inputs required of the left and right hands in the two-hand task. The simple combinational formula used was found to be only a partial measure of performance in the two-hand task, since significant interactions between hands occurred. It is suggested that

the formula may be more accurate in predicting the two-hand performance of skilled subjects.

7097

Brashchevskii, I. M. 1957
[THE EFFECT OF VESTIBULAR STIMULATIONS ON SHOOTING ACCURACY] Vliianie vestibulyarnykh razdrasheni na tochnost' strel'by. — Voenno-meditsinskiy zhurnal (Moskva), 1957 (9): 61-65. Sept. 1957. In Russian. DLC (RC970. V55, v. 1957)

The sensitivity of the vestibular apparatus to stimuli such as acceleration varies individually and is based on the cerebro-cortical regulations and the sensitivity of peripheral vestibular receptors. Angular acceleration stimulates the semicircular canals, producing nystagmus and the illusion of counterrotation. Tests with fighter plane pilots showed that, following rotation in a chair for 20 seconds, the accuracy of shooting was good despite the vestibular stimulation. In pilots-cadets vestibular stimulation decreased the shooting accuracy. This was most pronounced in persons with nystagmus. It is concluded that vestibular stimulation has little effect upon the accuracy of shooting in well trained and experienced fliers. It decreases, however, in persons suffering from motion sickness.

7098

Bowen, J. H.,
and R. Chernikoff
THE RELATIONSHIPS BETWEEN MAGNIFICATION AND COURSE FREQUENCY IN COMPENSATORY AIDED TRACKING [Abstract]. — Amer. Psychologist, 12 (7): 457-458. July 1957.
DLC (BF1.A55, v. 12)

A study was made of the effects of three linear and one non-linear display magnifications on performance with three complex courses in an aided compensatory tracking task. Early in learning, increases in magnification produced a lower tracking error with a low-frequency course, but not at other course levels. Late in learning, all magnifications showed equal improvement over the no-magnification condition with low- and intermediate-frequency courses, but not at the high-frequency level. No differences were found between the linear and non-linear magnifications.

7099

Brackmann, J. F.
ELECTROMYOGRAPHIC FACTORS IN AIRCRAFT CONTROL: THE ROLE OF MUSCLE POTENTIALS IN TRANSFER OF TRAINING. — Indiana Univ., Bloomington; issued by School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 55-132, Jan. 1957. 15 p. UNCLASSIFIED

A simple reaction time experiment (involving horizontal lever pressing in response to the appearance of a red light either on the right or left—the response in the second task was the reverse of that required in the first) was designed to answer three questions: (1) what is the effect of different amounts of practice upon pre-stimulus muscle tension, (2) what relation holds between the final level of pre-stimulus tension and the level during the following transfer situation, and (3) is the effect of practice reflected in the overt response? Contrary to the expected results, pre-stimulus tension increased as a result of practice, and a decline of pre-stimulus tension during practice did not occur. Response increase was determined to be inversely related to pre-stimulus tension during

transfer although neither is related directly and simply to amount of practice. These results are compared to those of earlier investigations. (From the author's summary and conclusions).

7100

Briggs, G. E.,
H. P. Bahrick, and P. M. Fitts
THE INFLUENCE OF FORCE AND AMPLITUDE CUES ON LEARNING AND PERFORMANCE IN A COMPLEX TRACKING TASK. — Ohio State Univ. Lab. of Aviation Psychology, Columbus (Contract AF 18(600)-1201); issued by Air Force Personnel and Training Research Center. Operator Lab., Randolph Air Force Base, Tex. (Project no. 7716, Task nos. 77292 and 57050). Research Report no. AFPTRC-TN-57-33, March 1957. viii+12 p. AD 98 938
PB 126 046

Four groups of male subjects served for 60 training and 30 transfer trials in a study designed to assess the influence of force and amplitude cues from a control column on learning and performance in a two-dimensional compensatory tracking task. Analysis of the scores during the final training trials revealed that both force and amplitude cues significantly affected performance, amplitude cues apparently exerting the greater influence. Thus, whereas particular combinations of force and amplitude characteristics in the control placed restrictions on terminal performance levels, they had little differential effect on the learning of this skill task. (From the authors' summary)

7101

Briggs, G. E.,
F. M. Fitts, and H. P. Bahrick
LEARNING AND PERFORMANCE IN A COMPLEX TRACKING TASK AS A FUNCTION OF VISUAL NOISE. — Jour. Exper. Psychol., 53 (6): 379-387. June 1957. DLC (BF1.J6, v. 53)

A study was made of the effects of training on performance in a two-dimensional compensatory tracking task involving noise (unwanted information) in the feedback loop of the tracking system. The tracking task simulated approach of an attack aircraft to a constant-velocity target. Four noise levels as well as a no-noise condition were represented by random wanderings of the target at increasing amplitude levels. After training in the no-noise condition, subjects were trained either in the no-noise condition, one of the four noise conditions, or in all noise conditions. All groups showed improvement during training, but a lower level of proficiency was reached with increases in noise level of the task. Subsequent testing of all groups in tracking under all noise conditions revealed no significant performance differences among groups. It is concluded that changes in the reliability of information feedback may impair performance, but have little effect upon learning of a tracking task. It is hypothesized that acquisition of skill in the primary large-amplitude corrections of tracking, which are not affected by visual noise, is sufficient for proficiency in a subsequent task requiring both primary and secondary corrections.

7102

Chernikoff, R.,
and W. Gaymon
THE DIFFERENTIAL EFFECTS OF STEP FUNCTION AND RATE FUNCTION COURSES ON PURSUIT

AND COMPENSATORY TRACKING [Abstract].—
Amer. Psychologist, 12 (7): 458. July 1957.

DLC (BF1.A55, v. 13)

A comparison was made of pursuit and compensatory tracking displays having complex course input patterns consisting of random steps, random rates, repetitive steps, or repetitive rates. The pursuit display was found to be superior for all inputs except the repetitive step.

7103

Chernikoff, R.,

and F. V. Taylor

EFFECTS OF COURSE FREQUENCY AND AIDED TIME CONSTANT ON PURSUIT AND COMPENSATORY TRACKING. — *Jour. Exper. Psychol.*, 53 (5): 285-292. May 1957. DLC (BF1.J6, v. 53)

Both pursuit and compensatory tracking performance was studied on target courses with frequencies covering a wide range of tracking difficulty. Tracking was either (1) position-type (infinite aiding) in which control movement resulted in a simple displacement of the control marker, (2) rate-type (zero aiding) in which control movement produced a marker velocity, or (3) 0.5 aiding in which control movement produced changes in both position and velocity. With both pursuit and compensatory tracking, the optimum aiding constant was found to shift upward with increasing course frequencies, while for the total range of frequencies the single best constant was 0.5. Pursuit tracking was superior to compensatory tracking at high and medium course frequencies, but was worse at low frequencies for 0 and 0.5 aiding. [cf. item no. 5672, vol. V]

7104

Conklin, J. E.

EFFECT OF CONTROL LAG ON PERFORMANCE IN A TRACKING TASK. — *Jour. Exper. Psychol.*, 53 (4): 261-268. April 1957. DLC (BF1.J6, v. 53)

The effect of control lags of 0.25-16.0 seconds on tracking performance was investigated with pursuit and compensatory displays. The control-lag function was either asymptotic or intermediate between asymptotic and a transmission-type lag. Input signals were either random or formed a coherent pattern. Tracking efficiency was found to decrease as control lag was increased, and was better with the asymptotic-type lag. With random signal input, performance was poor at the shortest lag level employed. The results support the hypothesis that performance in a perceptual motor task is dependent to a large extent on the ability to anticipate and predict system performance.

7105

Conrad, R.,

and B. A. Hille

SELF-PACING PERFORMANCE AS A FUNCTION OF PERCEPTUAL LOAD. — *Jour. Exper. Psychol.*, 53 (1): 52-54. Jan. 1957.

DLC (BF1.J6, v. 53)

An experiment was conducted to test the hypothesis that with increasing loads in a self-pacing sensori-motor task, subjects will work slower and maintain a constant performance level regardless of load condition. Eighteen subjects were tested on a task requiring operation of a corresponding switch at the moment when each of several point-

ers revolving at different speeds reached a given point. Subjects were allowed to regulate the speed of the pointers to maintain a maximum number of correct responses in relation to errors (missed responses). Analysis of scores showed that subjects paced themselves at a constant average rate regardless of the number of pointers presented, despite worsening performance with increasing loads.

7106

Davis, R. C.

ELECTROMYOGRAPHIC FACTORS IN AIRCRAFT CONTROL: MUSCULAR TENSION WHEN TASK REQUIREMENTS ARE CHANGED. — *School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 55-131*, Jan. 1957. 12 p. AD 130 331

UNCLASSIFIED

The hypothesis was advanced that the amount and sign of transfer in the transfer-of-training paradigm are ultimately determined by the relations among the system activities involved in all of the responses occurring in the two situations. An experimental test of this proposal was made, using the SAM Discrimination Reaction Test as the source of both tasks. The significance of half the signals was merely reversed to obtain the reversed task. Recordings of muscle action potentials showed a progressive decline in tension as the task was mastered and a rise in tension when the second task was begun. (Author's abstract)

7107

De Jong, J. R.

EFFECTS OF INCREASING SKILL ON CYCLE TIME AND ITS CONSEQUENCES FOR TIME STANDARDS. — *Ergonomics (London)*, 1 (1): 51-60. Nov. 1957. DLC (TA166.E7, v. 1)

It has been found that when a work cycle is repeated many times or a number of examples of the same product are made, the time required per cycle or product falls progressively over very long periods even among skilled and experienced operatives. This fact complicates the setting of time-standards for production work. Formulae are provided by means of which due account of the fall of cycle time may be taken when making time-studies and which provide a fundamental quantitative approach to the estimation of skill resulting from experience. (Author's abstract)

7108

Garvey, W. D.

and L. L. Mitnick

AN ANALYSIS OF TRACKING BEHAVIOR IN TERMS OF LEAD-LAG ERRORS. — *Jour. Exper. Psychol.*, 53 (6): 372-378. June 1957.

DLC (BF1.J6, v. 53)

Same as item no. 5683, vol. V.

7109

Garvey, W. D.,

J. S. Sweeney, and H. P. Birmingham

DIFFERENTIAL EFFECTS OF DISPLAY AND CONTROL DELAY TIME CONSTANTS ON TRACKING PERFORMANCE [Abstract].—*Amer. Psychologist*, 12 (7): 458. July 1957. DLC (BF1.A55, v. 12)

Subjects were required to operate a compensatory tracking system in which sigmoid delay time constants were inserted either between the control and

system output or between the system error and display. Control delay time constants up to 0.74 second did not affect performance, while display delays as small as 0.27 second produced significant deterioration.

7110

Garvey, W. D. 1957
OPERATOR PERFORMANCE AS A FUNCTION OF THE STATISTICAL ENCODING OF STIMULI. — Jour. Exper. Psychol., 54 (2): 109-114. Aug. 1957. DLC (BF1.J6, v. 54)

An experiment was conducted to determine the relative advantage of statistical coding of information in a display-control system consisting of lights with corresponding push-buttons. Five codes were tested, of which one transmitted a maximum amount of information through presentation with the most efficiency of high-probability messages conveying the least amount of information, and least efficient presentation of low-probability messages conveying the greatest amount of information. The other codes deviated from this principle in a systematic manner. Scores in a series of 29 trials indicated that at the earlier stages of practice best performance was obtained with the most efficient code, and poorest performance with the reverse of this code. Differences between scores with different codes diminished with practice, until the systematic differences between groups became unreliable at the end of the test series. Reversal of stimulus probabilities increased transmission time per signal for codes which were more efficient during the early stages of practice, but had no effect on codes which were less efficient at an early stage.

7111

Garvey, W. D.,
 W. B. Knowles, and E. P. Newlin
PREDICTION OF FUTURE POSITION OF A TARGET TRACK ON FOUR TYPES OF DISPLAYS. — Canad. Jour. Psychol. (Toronto), 11 (2): 93-103. June 1957. DLC (BF1.C3, v. 11)

A study was carried out to determine the accuracy with which future target positions could be predicted from tracks on four types of displays. Sixty problems including a variety of target courses, speeds, and shapes were used. Prediction accuracy was measured in terms of range and bearing errors from actual target position. The results were as follows: (1) The linear polar co-ordinate display provided the most accurate performance. (2) Range prediction was poorer on both polar and rectangular co-ordinate displays when non-linear range scales were employed. (3) Bearing accuracy was poorer on the nonlinear than on the linear polar co-ordinate display. (4) Subjects tended to underestimate the range of withdrawing targets. (5) Poorer prediction in both range and bearing was found for faster targets, or larger displacements. (Authors' summary, modified)

7112

Gregg, L. W.
CHANGES IN MUSCULAR TENSION DURING PSYCHOMOTOR PERFORMANCE. — Carnegie Institute of Technology, Pittsburgh, Pa. (Contract no. DA-19-129-QM-250); issued by Quartermaster Research and Development Center. Environmental Protection Research Div., Natick, Mass. Technical Report EP-54, May 1957. 27 p. AD 137 930 UNCLASSIFIED

Two separate experiments were carried out to investigate the relationships between changes in the distribution of tension and changes in proficiency of performance. In both experiments an arm-hand steadiness task and a tapping-aiming task were used to evaluate changes in task proficiency. In the first experiment, attaching a load of 67 pounds to the subject's back appeared to produce a decrease in proficiency of performance on the steadiness task and an improvement on the tapping task. Increases in generalized muscle tension appeared to accompany the introduction of the load when performing on either task. In the second experiment, specific muscle groups directly involved in the tapping or steadiness tasks were fatigued in order to produce proficiency changes which could be observed. Performance measures showed a decrement that depended on the conditions of fatigue, but few gross changes were found in action potentials in the individual muscle groups. Generalized tension as measured by the sum of the separate muscle potentials tended to increase with performance decrement. (Author's abstract, modified)

7113

Hartman, B. O.,
 W. E. Jaynes, and M. J. Herbert
ANALYSIS OF ABDUCTIVE AND ADDUCTIVE PHASES OF MOVEMENT IN CONTINUOUS TRACKING. — Army Medical Research Lab., Fort Knox, Ky. (USAMRL Project no. 6-95-20-001, Subtask S-1). Report no. 314, Dec. 10, 1957. ii+18 p. AD 149 025 UNCLASSIFIED

Analyses of performance in terms of time-on-target and error amplitude showed no differences in continuous tracking performance for abductive versus adductive movements, left-handed versus right-handed subjects, or preferred versus non-preferred hand. Lag error was characteristic of performance throughout the cycle. There was a suggestion of a difference in performance as a function of the direction of movement independent of any of the other experimental dimensions. (Authors' results)

7114

Hartman, B. O.
THE EFFECT OF TARGET FREQUENCY ON PURSUIT TRACKING. — Army Medical Research Lab., Fort Knox, Ky. (USAMRL Project no. 6-95-20-001). Report no. 263, March 20, 1957. ii+14 p. AD 125 587 UNCLASSIFIED

Eight subjects tracked one-dimensional simple sine waves ranging in frequency from 10 to 60 cycles per minute, using a springless joystick. Each increase in frequency led to poorer performance, both in time-on-target and hits scores. The change in performance was systematic, with no marked inflection points. Changes in target frequency had a greater effect on hits scores than on time-on-target scores. Analysis of single cycles suggested systematic changes in performance for different portions of the cycle. (Author's abstract)

7115

Hartman, B. O.
THE EFFECT OF THE EXTENT OF MOVEMENT (CONTROL SENSITIVITY) ON PURSUIT TRACKING PERFORMANCE. — Army Medical Research Lab., Fort Knox, Ky. (Project no. 6-95-20-001). Report no. 308, Dec. 9, 1957. iii+12 p. AD 148 400 UNCLASSIFIED

Five subjects tracked a 30 c.p.m. simple one-dimensional sine signal using a joystick control. Five extents of movement ranging from 4" to 11.4" were required to match the target signal. Increases in movement extent resulted in improved performance as measured by time-on-target and hits scores. (Author's abstract)

7116

Hauty, G. T.,

R. B. Payne, and R. O. Bauer

EFFECTS OF OXYGEN AND DEXTRO-AMPHETAMINE UPON WORK DECREMENT.—School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 56-127, Jan. 1957. 9 p. AD 134 303

UNCLASSIFIED

Following extensive training on a complex perceptual-motor task, subjects were given either a placebo or 5 mg. of d-amphetamine and then required to perform the task for 4 hours while breathing a mixture of air consisting of either 12, 21, or 60 percent oxygen. The extent to which d-amphetamine normally sustained proficiency was not attenuated by oxygen impoverishment nor enhanced by oxygen-enriched air. Increase in physiologic costs attributable to this analeptic, therefore, must be of minimal degree. This conclusion suggests that the sustentative effect of d-amphetamine is almost wholly derived from its facilitative effect upon the neurophysiologic correlates of alertness. (Authors' abstract)

7117

И'ianok, V. A.

[ON THE INFLUENCE OF ILLUMINATION ON THE PERFORMANCE OF COMPLEX MOTOR REACTIONS] O vliianii osveshchennosti na vyrabotku slozhnykh dvigatel'nykh reaktsii. — Biofizika (Moskva), 2 (2): 234-241. 1957. In Russian, with English summary (p. 241). DLC (QH505.A1B53, v. 2)

English translation in: Biophysics (New York: Pergamon Press), 2 (2): 231-236. 1957.

DLC (QH505.A1B54, v. 2)

Performance of complex motor reactions is accelerated at high illuminations and retarded at low illuminations. At lower illuminations the movements are slower and a greater number of components is needed to carry out the same complex motor reaction. Depth perception is more acute at higher illumination, particularly in the absence of motor reactions. The author concludes that the improvement of the activity of the motor analyzer, and the deterioration of the visual analysis carried out simultaneously with complex motor reactions must be considered in the choice of illumination for work requiring maximum accuracy of visual analysis and high efficiency of the motor analyzer.

7118

Klemmer, E. T.

RHYTHMIC DISTURBANCES IN A SIMPLE VISUAL-MOTOR TASK.—Amer. Jour. Psychol., 70 (1): 56-63. March 1957. DLC (BF1.A5, v. 70)

An experiment was conducted to investigate the cause of rhythmic difficulties associated with single responses to single stimuli presented at a rate of two per second. The rhythmic difficulty was indicated by an inconsistent phase-relation between stimulus and response, resulting in either an irregular distribution of responses over the entire inter-stimulus interval or a piling-up of responses close to the stimulus. Subjects were tested under stimulus-response condi-

tions in which (1) a single key was pressed in response to a single light flash; (2) one of five keys was pressed in ordered response to the flashing of one of five lights, requiring discrimination; (3) the stimulus in the five-key, five-light condition changes position regularly or randomly, with the response constant; (4) the response in the five-key, five-light condition changed position regularly, with the stimulus constant; and (5) both the stimulus and response in the five-key, five-light condition changed position regularly. Subjects were able to maintain a consistent phase-relation between stimulus and response only in condition (2).

7119

Marill, T.

THE PSYCHOLOGICAL REFRACTORY PHASE.—Brit. Jour. Psychol. (London), 48 (2): 93-97. May 1957. DLC (BF1.B7, v. 48)

A reaction-time experiment was performed in which the subject was presented with two lights and two handkeys. A flash of the left light served as a stimulus to press the left key with the left hand; the right light to press the right key with the right hand. Trials were given in which both lights flashed; the interval between flashes being randomly selected from nine possible values ranging from 0 to 600 msec., the various intervals occurring with equal probability. If s_1 and s_2 are the prior and subsequent of a pair of stimuli calling forth responses r_1 and r_2 , respectively, it was found: (a) that presenting s_2 during the s_1 - r_1 interval has no systematic effect on this interval; and (b) that the s_2 - r_2 interval varies markedly as a function of the s_1 - s_2 interval, with s_2 - r_2 longest for short s_1 - s_2 . (Author's summary)

7120

Miller, J. D.

ELECTROMYOGRAPHIC FACTORS IN AIRCRAFT CONTROL: DIFFERENTIAL MUSCLE TENSION DURING A DELAYED RESPONSE.—Indiana Univ., Bloomington; issued by School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 55-129, Jan. 1957. 8 p. AD 132 270 PB 128 486

Muscle action-potential records were obtained from the muscle groups closely involved in the possible alternative responses during the performance of two-choice, spatial delayed-response trials. While both muscle groups show an equal increase in muscular activity during the presentation of the informing stimulus, only the member finally to respond maintains this higher level of activity. The other member shows a dropping off of activity. These results support previous findings concerning the course of muscular activity just prior to an instructed response. The initial response to the informing stimulus is probably the a- or b-response or startle reflex. The maintenance of activity in the responding member is similar to that noted in several studies of muscular activity in the fore-period of a simple reaction-time situation. (Author's abstract)

7121

Patton, R. M.

ELECTROMYOGRAPHIC FACTORS IN AIRCRAFT CONTROL: THE EFFECT OF INDUCED TENSION UPON MUSCULAR ACTIVITY DURING SIMPLE VOLUNTARY MOVEMENT.—Indiana Univ., Bloomington; issued by School of Aviation Medicine, Randolph Air

Force Base, Tex. Report no. 55-133, Jan. 1957. 30 p.
AD 128 583 PB 128 488

Action potential recordings were made from two locations (right extensor digitorum and flexor digitorum muscles) as subjects responded to white noise (signaling for manipulation with either the right or left hand). At a given signal, the subject was required to execute a flexion movement with his left wrist, which raised the level of tension in the muscles of the right arm. After a varying interval, the subject had to react with the right arm by either flexion or extension. It was observed that the tension level just before the right-hand response was negatively correlated with reaction time to a moderate degree. Additional results presented include: (1) evidence opposed to R. C. Davis's hypothesis that facilitation is related to the rate of change of the induced tension, (2) data indicating flexion and extension could be differentiated on the basis of speed of the response (extension being more rapid, in general, than flexion), and (3) data indicating an absence of differential facilitation of extension and flexion by the left arm flexion movement, considering the data as a whole. However, flexion reaction time was faster than extension reaction time at the 0.8-second interval (which was approximately the point at which the maximum tension was induced by the precurrent movement). (25 references)

7122

Payne, R. B.,
and G. T. Hauty

SKILL FATIGUE AS A FUNCTION OF WORK-REST DISTRIBUTION.—School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 57-140, July 1957. 5 p. AD 149 040 UNCLASSIFIED

The explanatory relevance of certain aspects of Hull's reactive inhibition theory to skill fatigue was examined in a prolonged multichannel tracking situation in which, following preliminary training, Groups A, B, and C followed work-rest distribution ratios of 4:1, 0.67:1, and 0.25:1, respectively, for 4 hours elapsed time. When the amount of work performed was held constant, the residual inhibition at the conclusion of the reaction sequence was a negative growth function of the length of the inter-trial interval, as predicted from theory. The practical and theoretic implications of these results for tracking and watchkeeping tasks are discussed. (Authors' abstract)

7123

Poulton, E. C.

ON THE STIMULUS AND RESPONSE IN PURSUIT TRACKING. — Jour. Exper. Psychol., 53 (3): 189-194. March 1957. DLC (BF1.J6, v. 53)

Performance was tested in a pursuit-tracking task under display conditions in which the input or response pointers, or both, were visible only intermittently. Tracking was found to be most accurate when both pointers could be seen at all times, and was more accurate when only the input pointer was seen than when only the response pointer was visible. Discrete corrections of misalignment during glimpses of the intermittently-visible pointers were seen infrequently. Instead, a gradual correction of misalignment was generally observed, together with an attempt to match the movement of the input. When tracking was performed with the eyes closed, average performance

was significantly impaired, but in some instances performance was not affected.

7124

Poulton, E. C.

PURSUIT-TRACKING WITH PARTIAL CONTROL OF THE INPUT.—Amer. Jour. Psychol., 70 (4): 631-633. Dec. 1957. DLC (BF1.A5, v. 70)

Subjects were tested in a pursuit task requiring that a response pointer be kept in line with an input pointer whose movement was the resultant of two simple-harmonic displacements, one twice the size of the other. The larger of the two displacements of the input pointer was accelerated or decelerated during the trial, resulting in an input which was simple harmonic at the start of the trial, but which became more irregular as the difference in frequency between the two displacements increased. When subjects were allowed to regulate the frequency of the smaller displacement so that the input remained approximately simple harmonic during tracking, a significant improvement in performance was observed.

7125

Siddall, G. J.,

D. H. Holding, and J. Draper

ERRORS OF AIM AND EXTENT IN MANUAL POINT MOVEMENT.—Occupational Psychol. (London), 31 (3): 185-195. July 1957.

DLC (T58.A2N35, v. 31)

Essentially the same as the report, item no. 5702, vol. V.

7126

Strollo, M.

[CONSIDERATIONS CONCERNING SOME TESTS OF MOTOR REACTION SPEED IN A GROUP OF JET PLANE PILOTS] Considerazioni su alcune esperienze di rapidità di reazione motoria in un gruppo di piloti di apparecchi a reazione.—Rivista de medicina aeronautica (Roma), 20 (1): 57-70. Jan.-March 1957. In Italian, with English summary (p. 68).

DLC (RC1050.R56, v. 20)

The speed of motor reactions was tested in jet pilots by means of a new instrument (universal stimulator for reaction times) which measures the reaction time to visual and auditory stimuli and the response of arms, legs, or both to stimuli. Three types of tests were used: simple reaction, simple choice, and multiple choice. Relative correlation values were obtained by the position ranks method. The figures relative to the results concerning the mean of times, expressed in hundredths of a second, are: simple reaction time, 30.6; simple choice time, 66.5; multiple choice time, 94.6. The correlations were +48.1 between simple reaction and simple choice reaction; +38.5 between simple reaction and multiple choice reaction; and +39.8 between simple choice reaction and multiple choice reaction. This test may prove to be of use in aviation psychology and in the field of flight training.

7127

Sutton, G. G.

THE ERROR POWER SPECTRUM AS A TECHNIQUE FOR ASSESSING THE PERFORMANCE OF THE HUMAN OPERATOR IN A SIMPLE TASK.—Quart. Jour. Exper. Psychol. (Cambridge), 9 (1): 42-51. Feb. 1957. DLC (QP351.E95234, v. 9)

The measurement of performance of a human operator in a closed-loop control system is considered; it is suggested that the power spectrum of the fluctuations of his tracking error (or error spectral density curve) gives a useful picture of performance, and the equipment and technique for producing such a curve is described briefly. As an example of the technique the power spectra obtained on several subjects performing a simple task with a pressure joystick are given and the implications of the shape of the curve are discussed. (Author's summary)

7128

Taylor, W. K.

MEASUREMENT AND CONTROL IN THE HUMAN OPERATOR. — Trans. Soc. Instrument Technol. (London), 9 (3): 104-110; discussion, p. 110-111. Sept. 1957. DLC (TA165.S72, v. 9)

The paper describes an attempt to formulate a theory that will enable predictions to be made about the functional properties of the movement-control networks of the nervous system. The theory, which is based on the behavior of electrical analogues of neural and muscular units, would be difficult to test directly by recording simultaneously from multiple micro-electrodes, but the predictions appear to be compatible with the externally observed characteristics of controlled movements. Some speculations concerning the nature of the control signals sent out by the brain are discussed with reference to the possible ways in which the information required for generating the signals might be stored in the brain. (Author's synopsis)

7129

Vossins, G.

and G. Poklekowski

[INVESTIGATION OF THE EFFECT OF REACTION TIME ON THE AIMED HUMAN HAND MOVEMENT] Untersuchungen über den Einfluss der Reaktionszeit auf die gezielte menschliche Handbewegung. — Zeitschrift für Biologie (München), 109 (6): 458-465. 1957. In German, with English summary (p. 465).

DNLN

The course of movements following optical and acoustic stimulation is identical and the periods elapsing between stimulation and reaction to stimulation are longer, on average, following optical stimulation. The course of movements following the shortest and longest periods elapsing between stimulation and result of stimulation is identical when the same stimulus is applied. In regard to the regulation of the motion of human beings the duration of the motion does not depend on the length of the period elapsing between stimulation and motion as the result of stimulation. (Authors' summary)

7130

Walker, I. C.,

C. B. De Soto, and M. W. Shelly

REST AND WARM-UP IN BILATERAL TRANSFER ON A PURSUIT ROTOR TASK. — Jour. Exper. Psychol., 53 (6): 394-398. June 1957.

DLC (BF1.J6, v. 53)

A study was made of the effects of warm-up on bilateral transfer in a pursuit rotor task. Subjects were given eight practice trials using the right hand

before testing with the left hand. The transfer trials were preceded by 0, 4, or 12 minutes of rest followed or not by a warm-up trial with the right hand (one of the eight practice trials). Bilateral warm-up was found to have no effect on performance with the transfer hand. Unilateral warm-up had a marked effect, producing significant improvement from the first to the second left-hand trials, compared to subsequent improvement. Both bilateral and unilateral reminiscence were observed, indicating that reactive inhibition (reminiscence) is more general in its effects than set (warm-up). It is suggested that transfer of warm-up and transfer of work decrement depend on different aspects of task similarity.

g. Reflexes

7131

Berah, P. J.,

J. M. Notterman, W. N. Schoenfeld

THE DISCRIMINATIVE CONTROL OF A CONDITIONED HEART RATE RESPONSE. — Columbia Univ., New York; issued by School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 57-29, April 1957. 13 p. AD 140 466 PB 130 063

Studies on the interaction of autonomic and motor responses during avoidance conditioning were continued by investigation of: (1) the unconditioned effect on heart rate of a tone followed by a light; (2) the kind of discriminative control over heart rate acquired by such a tone-light stimulus as a result of discrimination training in which tone is the positive, tone-light the negative, and shock the unconditioned, stimulus. The experiment supports the hypothesis that, in avoidance training with light, the light acquires increasing discriminative control over heart rate, tending to check the conditioned deceleration to the tone, or to produce a counteracting acceleration. A comparison of results with those of an earlier study on avoidance conditioning with light suggests that the cues provided by avoidance response itself also play an important role in formation of the discrimination involving the conditioned response of the heart. (Authors' abstract)

7132

Bulygin, I. A.

[ON THE RHYTHMIC MUSCULAR ACTIVITY IN MAN AND ITS CONDITIONED REFLEX CONTROL] O ritmicheskoj myshechnoi deiatel'nosti cheloveka i ee uslovnoreflektornoi regulatsii. — Zhurnal vysshei nervnoi deiatel'nosti (Moskva), 7 (4): 469-478. July-Aug. 1957. In Russian, with English summary (p. 478). DLC (QP351.Z65, v. 7)

The author and his co-workers investigated the interaction between rhythmical motor reactions of the two hands, recorded by means of an ergograph, as well as their conditioned control. The interaction of the reactions, expressed in an intensification or weakening of the muscular activity, is determined by a number of factors such as the degree of loading the muscles, simultaneous or alternating movements of the hands, individual and age peculiarities of the subject, the initial functioning state of the motor apparatus and, above all, of the higher part of the central nervous system. Conditioned influences of environment on the muscular activity of man are diverse depending on the quality of unconditioned reflexes serving as a base for conditioning as well as on the positive or negative (in-

hibitory) meaning of the conditioned stimuli related to the first or second signal systems. The conclusion is drawn that ergography could be used in studying the higher nervous activity of man. (Author's summary)

7133

Pogrebkova, A. V. 1957
[ALTERATION OF INTEROCEPTIVE REFLEXES IN THE HYPERCAPNIC STATE OF THE ORGANISM] Ismeneniye inetroseptivnykh refleksov pri giperkapnicheskom sostoianii organizma. — Fiziologicheskii zhurnal SSSR (Moskva), 43 (4): 322-327. April 1957. In Russian, with English summary (p. 327). DLC (QP1.F57, v. 43)

The effect of breathing air containing 10-12% carbon dioxide upon the circulatory and respiratory reflexes from the intestinal and splenic chemoreceptors was investigated in perfusion experiments upon anesthetized cats. Considerable changes were observed in the pattern of reflex responses during hypercapnia. These changes depended on the content of carbon dioxide in the air, and on the duration of its inspiration, as well as upon the initial condition of the animal. After repeated administrations of carbon dioxide, a pathological condition may set in which manifests itself on the return to breathing of normal air. (Author's abstract, modified)

7134

Sapov, I. A.
[THE EFFECT OF PROPRIOCEPTIVE REFLEXES ON THE HEART: CERTAIN CHARACTERISTICS OF PROPRIOCEPTIVE CONDITIONED REFLEX INFLUENCES ON THE HEART] O reflektornykh vlianiyakh s propriotseptorov na serdtse: kharakteristika nekotorykh svoystv propriotseptivnykh uslovmoreflektornykh vliani na serdtse. — Biulleten' eksperimental'noi biologii i meditsiny (Moskva), 44 (9): 19-23. Sept. 1957. In Russian, with English summary (p. 23). DLC (R850.B55, v. 44)

Proprioceptive conditioned reflexes (CR) of the heart were established in five dogs after 6-10 combinations of conditioned stimulus (CS: 120 metronome beats/min.; 60 beats/min.) and unconditioned stimulus (a load of 80% of the animal's weight placed on its back) and investigated with respect to characteristics of formation, persistence, extinction, and reestablishment. The rapidity of formation of the CR, its complete reproduction by the CS, and the endurance of the CR point to the important role of proprioceptive conditioned reflexes in the adaptation of the heart activity to the environmental requirements.

h. Other Senses

7135

Finkelstein, B.,
and R. G. Pippitt
EFFECT OF ALTITUDE AND OXYGEN UPON TASTE. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio (Project no. 7156). WADC Technical Report no. 57-261, April 1957. iii+9 p. AD 118 245

UNCLASSIFIED

Effects of breathing 100% aviator's oxygen at a simulated altitude of 25,000 feet upon the taste sensi-

tivity of young, adult males are presented. Motivation for this study was derived from differences noted in food acceptability on the ground and in high-altitude flight situations. No effects of either altitude or breathing pure oxygen on primary taste sensations were found which could account for these differences. An inability to identify tastes both on the ground and at altitude was observed. From the results of this study, one can conclude that field taste test procedures should not include questions that assume a subject's ability to identify the primary tastes. This is particularly true of sour and bitter. For a true evaluation of these two tastes, a trained taste panel is necessary. (From the authors' abstract)

7136

Graham, D. T.,
H. Goodell, and H. G. Wolff
STUDIES ON PAIN: THE RELATION BETWEEN CUTANEOUS VASODILATATION, PAIN THRESHOLD, AND SPONTANEOUS ITCHING AND PAIN. — Amer. Jour. Med. Sci., 234 (4): 420-430. Oct., 1957. DLC

Thresholds for pain of pricking quality on the skin of the back during control periods were compared with those obtained during induced cutaneous vasodilatation. The pain threshold was lowered (and lowest) during the initial phases of vasodilatation, indicating that the lowered pain threshold of the skin was intimately associated with the initiation of vasodilatation rather than the fully vasodilated state. (Authors' summary, modified)

7137

Greene, L. C.
SPATIAL SUMMATION OF PAIN. — Naval Air Development Center. Aviation Medical Acceleration Lab., Johnsville, Pa. (Project no. NM 19 01 12.1, Report no. 14). Report no. NADC-MA-5714, Sept. 19, 1957. v+30 p. AD 152 983 UNCLASSIFIED

Spatial summation of pain (effect of size of area of stimulation in altering the sensory threshold and the intensity of sensation) was investigated using thermal radiation, cold immersion, and needle scratch as the methods of stimulation for the forehead, hands, and arms, respectively. A limited amount of spatial summation for pain was demonstrated with the thermal radiation technique. No statistically significant spatial summation for pain was obtained with the cold immersion method. It was not possible to demonstrate the presence of spatial summation of pain or to differentiate between spatial and temporal effects with the needle-scratch method. (41 references)

7138

Hendler, E.,
and J. D. Hardy
TEMPERATURE SENSATIONS ACCOMPANYING CHANGES IN SKIN TEMPERATURE. — Naval Air Material Center. Air Crew Equipment Lab., Philadelphia, Pa. (Project no. NM 17 01 13 2). Report no. NAMC-ACEL-350, Aug. 20, 1957. v+21 p. AD 142 790 UNCLASSIFIED

Using a radiometric apparatus to measure skin temperature while heating and cooling the skin surface, it was found that in the skin temperature range from 32° to 37°C reports of temperature sensation were best correlated with rate of change in skin temperature. The threshold for warmth sensation was found to be an increasing skin temperature

change rate of between 0.001° to 0.002°C. per second; for cold sensation, a decreasing rate of between 0.005° and 0.006°C. per second evoked threshold sensation. When the skin temperature did not change, sensation reports tended to be repetitions of imme-

diately preceding reports. Rapid fluctuations in skin temperature were not accompanied by temperature sensations which could be ascribed to the fluctuations themselves. (Authors' abstract) (21 references)

5. PSYCHOLOGY AND PSYCHIATRY

[Environmental effects under 6]

a. General

7139

Allan, M. D.

TRAINING IN PERCEPTUAL SKILLS. — Occupational Psychol. (London), 31 (2): 113-119. April 1957.
DLC (T58.A2N35, v. 31)

Although people have been acquiring skills since infancy, little is known about how to give formal training in skills. This paper is an attempt to link up some of the more recent views about the nature of perception with the learning of recognition skills, and to isolate some of the factors which appear to determine success. The views expressed in this paper are in opposition to the atomistic treatment or learning of parts which is still the familiar method of teaching recognition skills, and which has its basis in the beliefs regarding the nature of perception held by psychologists in the early part of this century. Instead, a modified Gestalt approach is recommended, based on the views of D. O. Hebb and others, that perception is a function of experience and therefore is a learned process. This involves a departure from the Gestalt doctrine of 'innate organization of perception' with its denial of the effect of previous experience upon perception, and postulates in its place the more flexible concept of an innate capacity for perceptual organization. (Author's summary)

7140

Ofiesh, G. D.

THE PROGRAM IN PSYCHOLOGY AT THE UNITED STATES AIR FORCE ACADEMY. — Amer. Psychologist, 12 (9): 579-582. Sept. 1957.
DLC (BF1.A55, v. 12)

The one-year course in psychology included in the academic program of the Air Force Academy attempts to present a thorough survey of the basic methods, facts, principles, understandings, and applications of scientific psychology. Air Force problems of psychology are introduced as examples of basic concepts and more specifically during a semester devoted to a study of Air Force engineering psychology, personnel psychology, leadership, and problems of military adjustment. Classes contain only 12 students, and instructors are shifted to a limited degree throughout the academic year.

7141

Pritchard, A. C.

EXPECTANCY EVALUATION AS AN AID TO DECISION MAKING. — Army Signal Engineering Laboratories, Fort Monmouth, N. J. (Project no. 3-55-00-200, Task no. 3-55-01-201). Nov. 1, 1957. 1+18 p.
AD 160 054 UNCLASSIFIED

A method is described for deriving a measure of the degree of certainty with which human reactions to a given situation may be anticipated. This method of situation evaluation is intended to supply a logical and quantitative foundation upon which decisions can be based. Techniques are outlined for breaking down a complex situation into simpler aspects. Division of work into sub-tasks enables a changing situation to be analyzed continuously. The range of situations

which may be evaluated by this method extends from personal to national. (Author's summary)

7142

Webb, W. B.

ASPECTS OF AVIATION PSYCHOLOGY. — Office of Naval Research, Research Rev., 1957 (Nov.): 20-25.
DLC (Q180.U5A354, 1957)

Aviation psychologists are concerned with abilities, motives, elements of training, meaning of training, momentary needs, and lifetime goals. Several conclusions reached through studies along these lines are presented and include the following: (1) the motivations of men entering aviation training are often quite tenuous; (2) in motivational testing, the development of tests that will not reflect the subjects' attitude toward taking the tests is critical; (3) psychological selection procedures can result in the saving of much money, even when their validities are rather low; (4) peer nominations, or "buddy ratings", are powerful research and administrative tools; (5) the proficiency of cadets at different stages of training can be effectively predicted; (6) cadets tend to worry more about failing in the program than they do about physical harm that may come to them as a result of flying accidents; (7) human engineering can and should be applied to the cadet's task; (8) accident proneness can, to some extent, be identified; and (9) follow-up studies of men who have completed training can help establish effective procedures for selecting the best men suited to enter the training program.

7143

Wilcox, E. J.

PSYCHOLOGICAL CONSEQUENCES OF SPACE TRAVEL. — Jour. Brit. Interplanetary Soc. (London), 16 (1): 7-10. Jan.-March 1957.
DLC (TL790.A1B7, v. 16)

Conditions within a spaceship (confined quarters, weightlessness, etc.) can contribute to the onset of emotional tension and to distortion of reality or psychotic perceptions in crew members. These may be prevented by careful and skilful selection of astronauts by using diagnostic procedures which evaluate the amount of tension existing in an individual and determine his actual or potential psychotic state. Therapeutic techniques used in clinical settings may be adapted to treatment in space. The group-therapy approach to emotional disturbances may be accomplished by having the therapist present on the spaceship's loud-speaker. A simulated run worked out experimentally before the actual space flight, giving special attention to personality types which operate together successfully, is advisable. This run may also be of value in selecting a crew on the basis of persisting freedom from psychopathology.

b. Psychology of Personality

7144

Ay

[PSYCHOLOGY OF THE PARACHUTIST] Psychologie

parachutists.—Forces aériennes françaises (Paris), 11 (129): 275-283. Feb. 1957. In French.
DLC (UG635.F8F66, v. 11)

Ninety percent of the parachutists questioned indicated that they were motivated by the extreme pleasure they derived from each jump. The parachutist's problems were found to be similar to those of the aviator. During maneuvers, reflexes and anxieties were comparable; weather conditions had the same importance for both; conversation was of the same nature, and comradeship in the mess, corridors, or in the air was prevalent. A parachutist lost prestige and authority when displaying fear during jumps and sooner or later was eliminated from the group. In actuality, the parachutist's mission begins once he has landed and begins combat tactics.

7145

Barron, F.

ORIGINALITY IN RELATION TO PERSONALITY AND INTELLECT.—*Jour. Personality*, 25 (6): 730-741. Dec. 1957. DLC (BF1.J66, v. 25)

Eight performance tests aimed at measuring originality were administered to 100 captains in the U. S. Air Force. After partialling out effects of verbal intelligence, significant relationships derived from psychologists' comparison of low- and high-scoring subjects were: (a) disposition towards integration of diverse stimuli; (b) energy, fluent output, involvement; (c) personal dominance and self-assertion; (d) responsiveness to impulse and emotion; (e) expressed femininity of interests; and (f) general effectiveness of performance. Further differentiation of individuals relatively high in originality and relatively low in intelligence from those high in both aspects taken from a sample of 343 officers suggests undercontrol of impulse in the former group and superior control in the latter group.

7146

Berish, P. J.,

J. M. Notterman, and W. N. Schoenfeld
THE EFFECT OF EXPERIMENTAL ANXIETY UPON VERBAL BEHAVIOR.—Columbia Univ. Dept. of Psychology, New York, N. Y.; issued by School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 57-26, April 1957. AD 142 992 7 p.
PB 130 200

Experimental anxiety defined in terms of the conditioned heart rate response was studied as to its effect on word association. There was evidence that the word-association task exerted a direct accelerative effect upon the cardiac response, and, through this, tended to interfere with heart rate conditioning and extinction. Generally, the level of anxiety generated by this procedure did not disrupt the verbal chains involved in word association. (Authors' abstract)

7147

Brengelmann, J. C.

[EXTRAVERSION, NEUROTIC TENDENCY, AND RIGIDITY IN AN INVERSION EXPERIMENT (PRISM LENSES)] Extraversion, neurotische Tendenz und Rigidität im Umkehrversuch (Prismenbrille).—*Zeitschrift für experimentelle und angewandte Psychologie* (Göttingen), 4 (3): 339-362. [1957] In German, with English summary (p. 361). DNLM

Tracing of a simple design while wearing prismatic inversion lenses (left-right; up-down) was investigated

in a 30-minute session on each of two days with a group of 49 normal subjects. Scores were related to personality factors of extraversion, rigidity, and neuroticism. Extraverted and rigid subjects made significantly more errors than their introverted and less rigid opponents. Significant differences between these groups also were found in regard to the ratio of error/correct tracing. Left-right, or up-down lens inversion were not related significantly to any of the criteria. Intra-individual variability in error tracing was highest in extraverted and rigid subjects. Rigid subjects particularly make highly irregular and excessive movements. Individual differences in susceptibility to vestibular-autonomic phenomena, e.g., muscle tone, respiration, sweating, gastrointestinal activity, and nausea during prism inversion and in the degree of recovery on the second day may contribute to the interpretation of underlying phenomena. (Author's summary, modified)

7148

Campbell, D. T.

INTERRELATIONSHIPS AMONG LEADERSHIP CRITERION MEASURES FOR A POPULATION OF AIR FORCE PILOT CADETS.—Northwestern Univ., Evanston, Ill. (Contract no. AF 18(600)-170); issued by Air Force Personnel and Training Research Center, Lackland Air Force Base, Tex. (Project no. 7716, Task no. 57050). Research Report no. AFPTRC-TN-57-70, June 1957. vii+4 p. AD 131 421
PB 148 278

Attitude tests were administered in 1954 to two classes at advanced training bases of the Flying Training Air Force. Criterion measures of leadership of several kinds were obtained for the purpose of validating the tests. The measures included official military aptitude ratings (MAR), training grades, demerit records, and nomination ballots for classmates. The separate MARs used to obtain the final military grade showed significant agreement with this grade, but the agreement between classmates and military instructors was higher than between the two instructor groups. There was a lack of relationship between the demerits (awarded primarily by military instructors), and the grade and MAR given by flying instructors. Ratings from the cadet nomination ballots correlated highly with each other. Comparisons of the nomination ratings with MARs indicated that the cadets could distinguish between their own evaluations of the person and evaluations he received from superiors. The comparison of in-service ratings with reputational measures indicates that in-service records can be considered valid criteria for use in personnel research. (From the author's summary)

7149

De Rivera, J.

THE PREDICTION OF ANXIETY IN AVIATION STUDENTS [Abstract].—*Amer. Psychologist*, 12 (7): 443. July 1957. DLC (BF1.A55, v. 12)

Flight students were divided into groups according to whether or not they demonstrated above-average anxiety in flight training. A multiple correlation predicting anxiety was derived from tests given before flight training.

7150

Doehring, D. G.

THE RELATION BETWEEN MANIFEST ANXIETY AND RATE OF EYEBLINK IN A STRESS SITUATION.—Central Inst. for the Deaf, St. Louis, Mo. (Contract Nonr-1151 (02)); issued by Naval School of

Aviation Medicine, Pensacola, Fla. (Research Project no. NM 13 01 99, Subtask 1). Report no. 3, Dec. 13, 1957. ii+10 p. UNCLASSIFIED

Eyeblink responses to stressful and non-stressful words on a free association test were determined for 24 subjects. Two manifest anxiety tests were also administered. The stressful words evoked a significantly higher blink rate than the non-stressful words. A significant positive correlation was found between one measure of manifest anxiety and blink-rate response to stressful words. (Author's abstract)

7151

Egbert, R. L.,

T. Meeland, V. B. Cline, E. W. Forgy, M. W. Spickler, and Charles Brown

FIGHTER I: AN ANALYSIS OF COMBAT FIGHTERS AND NON-FIGHTERS.—George Washington Univ., Human Resources Research Office, Washington, D. C. Technical Report no. 44, Dec. 1957. vi+69 p. AD 158 178 UNCLASSIFIED

A comparison of the fighter and non-fighter pilots indicates that the fighter tends to be a "doer", more intelligent, socially mature, and masculine. He is also preferred socially and in combat by his peers, has greater emotional stability, leadership potential, and a stable home life. The combat fighter has better health and vitality, a greater fund of military knowledge, and greater speed and accuracy in manual and physical performance. Research results indicate that men who are low in intelligence tend to make poor fighters. The qualities of fighters are potentially measurable and may possibly be identified by appropriately developed tests. Such tests could be used in the selection of combat leaders.

7152

[FEAR IN FLYING PERSONNEL] La peur dans le personnel navigant.—Force aérienne, Service de santé, Bulletin technique d'information [Bruxelles], 1957 (May): 1-12. In French. DNLN

Fear in flying personnel causes a decrease in morale and in flight performance. Physiological symptoms of fear are manifest by the urgent need to urinate, diarrhea, vomiting, hyperventilation, redness or paleness, and cardiac rhythm disorders. Fear is also manifested by disorders of character and behavior (disorganization, inefficiency, anxiety, somatization, escape). Habitual manifestations of fear in personnel include: fear of flying, refusal to fly, and operational or flight fatigue. These constitute both medical and administrative problems. Fear can be prevented by developing a good concept of leadership and esprit de corps; by limiting the situations which may cause fear by presenting lectures on what to expect under different conditions; and by the creation of social and group activities.

7153

Fulkerson, S. C.

ADAPTABILITY SCREENING OF FLYING PERSONNEL: RESEARCH ON THE MINNESOTA MULTIPHASIC PERSONALITY INVENTORY.—School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 57-106, July 1957. 17 p. AD 145 000 PB 132 266

The Minnesota Multiphasic Personality Inventory was applied to the prediction of a criterion of adjustment to flying training. Nine scales correlated significantly with this criterion: K, F, Pd, the obvious items of D and Hy, Taylor Manifest Anxiety, Winne

Neuroticism, and two departmental scales. An empirical key consisting of 142 items was constructed from these scales, and was successfully validated against three different measures of adjustment. This key was unrelated to measures of aptitude for flying and to pass-fail training outcome. (Author's abstract)

7154

Johnson, L.,

R. Knaff, and I. Pollack

THE RUNNING MEMORY SPAN OF THE HUMAN OPERATOR [Abstract].—Amer. Psychologist, 12 (7): 451-452. July 1957. DLC (BF1.A55, v. 12)

Immediate recall tests of running memory span (units correctly reproduced from the end of a message of uncertain length) were conducted at several rates of message presentation. Running memory span was found to be significantly lower than the usual span, in which message length is known, for messages of intermediate and long lengths and at intermediate and slow rates of message presentation. Both running memory span and the usual span were increased as the rate of message presentation was decreased.

7155

Karson, S.,

K. B. Pool, and S. L. Freud

THE EFFECTS OF SCALE AND PRACTICE ON WAIS AND W-B I TEST SCORES.—Jour. Consulting Psychol., 21 (3): 241-245. June 1957.

DLC (BF1.J575, v. 21)

The equivalence of scores on the Wechsler Adult Intelligence Scale (WAIS) and the Wechsler-Bellevue Intelligence Scale, Form I (W-B I) was assessed and the transfer effects from one scale to the other evaluated. A group of 52 flyers referred to the School of Aviation Medicine for medical and psychological evaluation served as the test sample. Although the subjects tended to retain the same relative rank on both scales, significant differences between subtests of both scales indicate that W-B I is not a satisfactory alternate for WAIS. Practice effects were found on all of the verbal and performance subtests, and on the Verbal IQ, Performance IQ, and Full Scale IQ, regardless of the sequence in administration of the scales.

7156

Phillips, P. B.

PSYCHOSOMATIC DISORDERS IN PILOT TRAINEES: REPORT OF NINE CASES.—Jour. Aviation Med., 28 (4): 364-369. August 1957. DLC (RC1050.A36, v. 28)

A number of cases are presented illustrating the dangerous aspects of psychosomatic disorders in flight students. Symptoms pointed up by this study include low g tolerance, hyperventilation, vertigo, headache, nausea and vomiting, delayed reaction time, unconsciousness, "clouding of consciousness", confusion, blurred vision, and constricted visual fields. All patients had what was believed to be an adequate medical work-up, and the conclusion of trained flight surgeons is that these are all primary symptoms of anxiety. (Author's summary, modified.)

7157

Ramo Simón, M.

[PSYCHOTECHNIQUE IN THE AIR FORCE] La psicotecnia en el Ejército del Aire.—Revista de aeronáutica (Madrid), 17 (194): 10-17. Jan. 1957. In Spanish. DLC (TL504.R516, v. 17)

Psychological evaluation of a candidate's memory, intelligence, mechanical aptitude, sensory and motor coordination, and emotional status is discussed. Psychological test batteries, together with other medical criteria, are of great value in the selection, training, and classification of pilots and aviation specialist personnel.

7158

Roff, M.

PRESERVICE PERSONALITY PROBLEMS AND SUBSEQUENT ADJUSTMENTS TO MILITARY SERVICE: THE PREDICTION OF PSYCHONEUROTIC REACTIONS.—Univ. of Minnesota Inst. of Child Welfare, Minneapolis; issued by School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 57-136, Nov. 1957. 11 p. AD 152 811 PB 135 492

A longitudinal follow-up study is being made of patients of public school child guidance clinics and a nonpatient control group through subsequent military service. The present report compares two groups (55 in each) of former patients of the child guidance clinics: one group was diagnosed as neurotic while in service; the other group represented individuals who attained a grade of sergeant or higher with no adverse indications in their military records. Childhood tendencies to antagonize others to an unusual degree were shown to distinguish the potential neurotic with a high degree of accuracy. (Author's abstract)

7159

Sells, S. B.,

D. K. Trites, and H. S. Parish

CORRELATES OF MANIFEST ANXIETY IN BEGINNING PILOT TRAINEES.—*Jour. Aviation Med.*, (6): 583-588. Dec. 1957. DLC (RC1050,A36, v. 28)

A paired-adjective check list, an annoyance scale, a modified Cornell word form, and the Taylor anxiety scale were given to 249 students before and after the first flight, before and after the seventh flight, after the first solo flight, and after the 40-hour check flight. Self-estimates of final class standing, buddy ratings, and preference for jet- or multi-engine planes were given by the students. A subsequent decrease in anxiety scores is associated with jet preference and estimated high class standing, while the further increase in anxiety is associated with preference for multi-engine planes and a low estimate of class standing. Students having high anxiety also generally received lower buddy ratings.

7160

Willingham, W. W.

INTERDEPENDENCE OF SUCCESSIVE JUDGMENTS: I. COMPARATIVE JUDGMENT. II. AFFECTIVE JUDGMENT. III. ABSOLUTE JUDGMENT.—Naval School of Aviation Medicine, Pensacola, Fla. (Research Project NM 14 02 11, Subtask 12). Report no. 2, July 31, 1957. iii+17 p. AD 154 615

UNCLASSIFIED

The results indicate that successive comparative judgments are not independent. Further research is indicated in order to determine more specifically under what conditions successive judgments tend to be interdependent. "Like-dislike" responses of 1200 subjects to four designs were analyzed. No evidence of any response bias was found. It was concluded that the alternation bias does not operate in a two-choice affective judgment situation. Further, it was concluded that the previously reported alternation bias is more likely due to a misconception of chance

rather than to any generalized tendency to alternate. The results agree with previous work on sensory judgments in showing that responses tend to be biased in the direction of the previous response, and that the bias increases as the number of response categories increases. When the subjects were instructed to rate the extreme stimuli first, the bias effect disappeared. (From the author's summary)

7161

Wulfften Palthe, P. M. van

THE STIPPLE TEST: A FOLLOW-UP STUDY.—*Aeromedica acta* (Soesterberg, Netherlands), 5: 327-346. 1956/57. In English. DNLN

Further studies on the stipple test (an adaptation of the Bourdon-Wiersma test) were conducted to assess its value in the selection test battery for pilots. First, a randomly selected group of 1193 aviation applicants from 5000 examinees were given the stipple test. The average score was 65. In all nonpathological cases there was a balanced relation between speed, regularity, and accuracy. Each individual has a very constant performance pattern which remains unaffected by training or the test situation. Fatigue, hypoxia, alcohol, drugs, and sometimes hyperventilation are selected in the outcome of the test. The Bourdon scores of applicants to a commercial aviation school were slightly higher and showed less spread than those of military aviation applicants. This is presumed to be due to population differences in the two samples. Although a low Bourdon score cannot be regarded as prognostically unfavorable, it serves as an indicator for further neuropsychiatric investigation. The stipple test was used also to investigate the level of consciousness in experiments with hyperventilation.

c. Social Psychology

7162

BIBLIOGRAPHY OF UNCLASSIFIED RESEARCH REPORTS IN GROUP PSYCHOLOGY.—Office of Naval Research, Washington, D. C. ONR Report ACR-22, Sept. 1957. iii+41 p. AD 145 739 UNCLASSIFIED

This bibliography lists 750 technical reports submitted to the Office of Naval Research in the field of group psychology as of January 1, 1957. Investigations fall into two general areas: the structure and function of the group as a whole, and the behavior of the individual as a group member. The first of these attempts to analyze group structure and function, determining the attributes which should be measured and developing methods of measuring them and the relationships among them. The second project focuses attention on the measurement of the characteristics of the individual group member, attempting to measure such variables as motivations, needs, perceptions, and social skills. A small area of research included is that of disturbed psychological states.

7163

Ziller, R. C.

FOUR TECHNIQUES OF GROUP DECISION MAKING UNDER UNCERTAINTY.—*Jour. Applied Psychol.*, 41 (6): 384-388. Dec. 1957. DLC (BF1.J55, v. 41)

Forty-five aircrews comprising approximately 500 men were required to reach a decision on a problem by methods in which (1) the leader imposed his decision on the group without discussion, (2) the leader guided the decision by expressing his opinion

before discussion, (3) the leader acted as discussion leader, but did not state his opinion immediately, or (4) the leader acted as chairman of the discussion and did not express his opinion. Administration of a questionnaire revealed greatest satisfaction with method (3), and least with method (1). Group members tended to perceive greater problem difficulty with less authoritarian decision-making processes. Group-centered methods also produced a greater number of decisions involving personal risk to the members.

e. Alertness and Vigilance

7164

Bowen, H. M.

VIGILANCE: RADAR MONITORING [Abstract].—
Amer. Psychologist, 12 (7): 444-445. July 1957.

DLC (BF1.A55, v. 12)

A study was made of the effects of number of signals per hour, signal on/off flash rate, presence of video noise, and subject differences on radar vigilance. The results suggest that observers gauge their attentive effort according to the (experienced) demands of a vigilance situation. It is concluded that vigilance performance trends are primarily determined by task features and individual differences, rather than by the passage of time.

7165

Holland, J. G.

OPERANT OBSERVING RESPONSES WITH LIMITED
AND UNLIMITED TIME FOR DETECTION [Abstract].
—Amer. Psychologist, 12 (7): 451. July 1957.

DLC (BF1.A55, v. 12)

Omission of instructions to detect signals as quickly as possible resulted in a low uniform response rate in a task incorporating a variable schedule of signals. When signals were shut off after one second if subjects failed to detect them, the response of some subjects approached extinction. Subjects who detected a sufficient number of transient signals showed a marked increase in response rate.

7166

Jerison, H. J.,

and R. A. Wallis

EXPERIMENTS ON VIGILANCE. II. ONE-CLOCK
AND THREE-CLOCK MONITORING.—Wright Air
Development Center, Aero Medical Lab., Wright-
Patterson Air Force Base, Ohio (Project no. 7193-
71610). WADC Technical Report no. 57-206, April
1957. v+34 p. AD 118 171 PB 131 191

Two experiments on prolonged monitoring of Mackworth-type clocks are reported. In one experiment with thirty-six subjects a single clock was monitored. It was found that performance dropped from about ninety percent of the signals found to about fifty percent during the first half hour of work, and that the performance drop appeared to be continuous. In a second experiment, eleven subjects each monitored a panel of three clocks. Their performance curve appeared to be flat, but it seems likely that a rapid decrement from the 45 percent to the 27 percent level occurred during the first three minutes of work. These results are discussed in terms of the present state of knowledge about the human operator as a monitor and in terms of recommendations that have been made in the past concerning limitations of length of watches for monitors in order to maintain their efficiency. (Authors' abstract)

6. BIOLOGICAL, PHYSIOLOGICAL, AND PSYCHOLOGICAL EFFECTS OF ENVIRONMENTAL FACTORS AND STRESSES

a. General

7167

Appelzweig, M. H.,
and G. Moeller

THE ROLE OF MOTIVATION IN PSYCHOLOGICAL STRESS.—Connecticut Coll., New London (Contract Nonr 996(02), Project no. NR 172-228). Technical Report no. 3, Jan. 1957. 9 p. AD 125 278

UNCLASSIFIED

An assessment is made of the value of psychological stress and conflict concepts as they relate to each other and to others available to describe the same or similar events. Varying definitions of stress are presented with essential agreement being given to H. R. Schaffer's definition which places great importance on motivation. Brief, preliminary data are presented showing the effects of a motive conflict on behavior. It is suggested that a meaningful approach to an understanding of psychological stress is through an evaluation of individual motivations. Prediction of stress sensitivity in individual cases depend on an analysis of both environmental and motive systems, the relation between these systems, and the behavior modes developed to serve them.

7168

Baran, C.,

and B. Lewalaki

[PULMONARY VENTILATION IN RATS IN HYPOXIC-HYPERCAPNIC HYPOTHERMIA] Wentylacja płuc w hipotermii hipoksyjno-hiperkapniczej u szczurów. — *Acta physiologica polonica* (Warszawa), 8 (3-3a): 280-281. 1957. In Polish.

DLC (QP1.A27, v. 8)

Deep hypothermia (14-15° C.) decreased the respiratory frequency in normal rats (10-25/min.). With increasing temperature (19-20° C.) the respiratory frequency became 100/min. At further warming the respiratory frequency rose to 165/min. and ventilation increased. Urethane anesthesia or intraperitoneal administration of it increased the frequency and decreased pulmonary ventilation. [No data on hypoxic or hypercapnic conditions are given by the author].

7169

Bennett, E. M.,

D. Kemler, and B. T. Levin

EMOTIONAL ASSOCIATIONS WITH AIR AND RAIL TRANSPORTATION.—*Jour. Psychol.*, 43 (1): 65-75. 1957. DLC (BF1.J67, v. 43)

Word associations with air and rail travel were elicited from 47 subjects by the Polydiagnostic method, in which a 3-term preferential choice was made from all terms contained in a list of 15 descriptive adjectives. Five lists were administered for both air and rail transportation. Air travel was significantly associated with fear (anxious, nervous, fearful, helpless), recklessness and bravery, speed (hasty, prompt), and positive concepts (cheerful, curious, friendly, intelligent, and practical). Rail travel was associated with feelings of responsibility (proper, careful, practical, modest, sincere), slowness (weary, lazy, patient), pleasurable gregarious-

ness (cheerful, friendly, social), and ridiculousness (silly, foolish). When scores for air and rail travel were compared, air travel was found to have a greater association with qualities of speed, asociality, social impropriety (less proper, sincere, decent, kind), aggressiveness (strong, powerful, fierce), and danger.

7170

Bevan, W.,

and R. M. Patton

SELECTED BIBLIOGRAPHY: FATIGUE, STRESS, BODY CHANGE AND BEHAVIOR.—Lockheed Aircraft Corp., Marietta, Ga. (Contract no. AF 33(616)-3745); issued by Wright Air Development Center. Aero Medical Lab. Wright-Patterson Air Force Base, Ohio (Project no. 6335, Task no. 63614). WADC Technical Report no. 57-125, April 1957. iv+64 p. AD 118 091 PB 131 299

This bibliography surveys the entire field of stress and fatigue and the accompanying behavior and bodily changes. A total of 883 references are alphabetized governing the 10-year period from 1946-1956. A complete topical index concludes the bibliography, with classification under a wide scatter of headings. (Authors' abstract, modified)

7171

Bonner, R. H.

THE EFFECTS OF STRESS ON UROPEPSIN EXCRETION.—Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio (Project no. 7220, Task no. 71742). WADC Technical Note no. 57-427, Dec. 1957. 11 p. AD 142 256 PB 131 708

A preliminary investigation of uropepsin changes in simulated flight stress is described. Twenty-three subjects were tested under conditions of prolonged positive g, crew confinement, exposure to high temperature-high altitude, and visual and auditory deprivation. Uropepsin changes are reported, and an effort is made to interpret and evaluate them. Modifications of the assay technique are also discussed. (Author's abstract)

7172

Camelin, A.,

M. Siffre, F. Forestier, and P. Ramel

[UREMIGENIC CONSEQUENCES OF PROLONGED EXPOSURE TO COLD AT HIGH ALTITUDE: PLASMATIC HYPOTONIA AND ITS CORRECTION] Les suites urémigènes d'une exposition prolongée au froid en haute altitude: hypotonie plasmatique et sa correction. — *Journal d'urologie médicale et chirurgicale* (Paris), 63 (9): 658-664. Aug.-Sept. 1957. In French. DNLM

A case is reported of a helicopter pilot, transporting skiers to an altitude of 4000 meters, who developed plasma electrolyte imbalance (Mach dehydration syndrome) following an overnight stay at high altitude (4000 to 4300 meters) during the winter (-15° C.). This syndrome presents cellular dehydration, mental depression, asthenia, somnolence, unconsciousness, and other clinical manifestations. He was treated surgically, ophthalmologically, and generally. Factors contributing to the etiology of this condition were both atmospheric (cold, walking at night), and

personal (no survival training or preparation for stay at high altitude, mental stress).

7173

Cope, F. W.,

and B. D. Polis

CHANGES IN PLASMA TRANSAMINASE ACTIVITY OF RHESUS MONKEYS AFTER EXPOSURE TO VIBRATION, ACCELERATION, HEAT, OR HYPOXIA.—Naval Air Development Center. Aviation Medical Acceleration Lab., Johnsville, Pa. (Project no. NM 11 01 12.7, Report no. 5). Report no. NADC-MA-5718, Dec. 11, 1957. iii+6 p. AD 209 173

PB 144 717

Significant increases in plasma glutamic-oxalacetic transaminase levels were observed in monkeys exposed to vibration, acceleration, heat, hypoxia, or noise and confinement stress. In all but 1 of 17 animals, no specific tissue damage was evident. The increase in plasma transaminase is interpreted as a non-specific stress effect. The data suggest that caution should be exercised in basing clinical judgments on serum transaminase levels.

7174

Dan'lin, B. S.

[INVASION OF THE COSMOS] Vtorozhenie v kosmos. — Nauka i zhizn', 24 (12): 4-8. Dec. 1957. In Russian. DLC (Q4.N43, v. 24)

Following a description of "Sputnik II" and its role in the studies of cosmic rays, the author discusses the behavior of the enclosed animal (dog). At the nearly normal conditions maintained in the hermetically sealed chamber, the animal, in a lying position, tolerated the 7-day space flight well without any ill-effects on the organism.

7175

Domanaki, T. J.

THE STRESS CONCEPT APPLIED TO FLYING. — Jour. Aviation Med., 28 (3): 249-252. June 1957. DLC (RC1050.A36, v. 28)

Stress response is defined as the product of the interaction of a stress with a susceptible individual. Fatigue is treated as a stress response associated with the sheer duration of job performance (flying). Applied to flying, eosinopenia appears to provide qualitative evidence of the occurrence of an emotional stress response in otherwise healthy individuals. The learning process, aircraft malfunction, accidents, and near accidents are classified as emotional stresses. The blood eosinophil count has been used to provide information concerning two categories of flightline problems: (1) individual differences in the response to a given stress, and (2) the relative severity of a particular inflight stress or stress complex. (Author's summary)

7176

Fraser, D. C.

ENVIRONMENTAL STRESS AND ITS EFFECT ON PERFORMANCE.—Occupational Psychol. (London), 31 (4): 248-255. Oct. 1957. DLC (T58.A2N35, v. 31)

Continued research on the measurement of the evidence of stress indicates that a satisfactory interpolated test for the effects of stress is difficult to achieve, but probably involves at least these three characteristics: continuous serial performance, being stressful, and a minimum of the knowledge of results. Several such tests have been devised, but even with these it is usually better to administer the

test as an integral part of the total stress situation rather than as an interpolated test. Using such measures, then, it has proved possible to show reproducible effects on performance of temperature, humidity, hard physical work, ambient noise, and sleep deprivation. Specific experiments studying these factors are discussed. Major points of the pattern of breakdown under stress are outlined.

7177

Garvey, W. D.

THE EFFECTS OF "TASK-INDUCED STRESS" ON MAN-MACHINE SYSTEM PERFORMANCE.—Naval Research Lab., Washington, D. C. NRL Report no. 5015, Sept. 9, 1957. 11 p. AD 143 374

UNCLASSIFIED

Three experiments were conducted to determine the effect of stressing the human element in a man-machine tracking system on the performance of three systems (an acceleration control system, an acceleration-aided control system, a position control system). In the first experiment performance was enhanced through the redesign of some of the mechanical components of the system; when the human operator was stressed, this enhancement was accentuated. In the second experiment two man-machine systems with different dynamics were equated by selecting the best operators to control the poorer system and the poorest operators to control the better system. Under stress the performance of the systems differed in the same direction as before selection was employed. In the third experiment two systems with different dynamics were equated by training; again under stress the performance of the two systems differed in the same direction as before training. These results are discussed in terms of implication for training, selection, and human engineering as well as for scientific evaluation of man-machine systems. (Author's abstract, modified)

7178

Hale, H. B.,

G. Sayers, K. L. Sydnor, M. L. Sweat, and D. D. Van Fossan

BLOOD ACTH AND PLASMA CORTICOSTEROIDS IN MAN DURING EXPOSURE TO SIMULATED ALTITUDE AND HIGH AMBIENT TEMPERATURE.—School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 57-55, Feb. 1957. 16 p. AD 140 528 PB 130 082

Hypoxia (equivalent to that at 14,000 feet altitude) acting alone or in combination with high ambient temperature ($50 \pm 1^\circ\text{C}$., humidity less than 20 %), and high ambient temperature acting alone induced no significant changes in the peripheral blood ACTH, plasma 17-hydroxycorticosterone, and corticosterone-like steroids of healthy male subjects exposed for periods of 15 to 45 minutes. In one experiment, 3 of 5 subjects who experienced hypoxia in a chamber heated to this same level exhibited an increase in the concentration of peripheral plasma 17-hydroxycorticosterone concentration at the end of 3 hours. In a second experiment, 5 of 8 subjects exhibited an increase at the end of 2 hours of exposure. (Authors' abstract) (26 references)

7179

Hale, H. B.

PHYSIOLOGICAL SELECTION.—In: Symposium: physical standards and selection, p. 132-134. Randolph Air Force Base, Tex.: Air University, 1957. AD 144 144

UNCLASSIFIED

A positive approach of physiological selection is considered in investigations attempting to identify individuals with unusual capacities. The reactions of over 100 men were studied during exposure to heat in combination with hypoxia. Adrenocortical and nitrogen determinations were also studied in the attempt to find correlations between them and specific physiologic responses. The individual showing cardiovascular and respiratory adjustments to hypoxia proportionate to the need and which are not accompanied by adrenocortical response or nitrogen loss may be the one who has inherent adaptability. Where physiologic adjustments (which may be unduly great) are accompanied by adrenocortical response or nitrogen loss, the individual is showing high metabolic cost which may indicate low adaptability. Respiratory measurements showed that in some there was definitely hyperventilation, and in these there was a correlation between the respiratory quotient and one of the adrenocortical hormones. The over-reactive individual was thus found through a respiratory measure.

7180

Jones, Melvill G.
GASTRIC SECRETOMOTOR ACTIVITY AND RENAL EXCRETION OF UROPEPSINOGEN DURING PERIODS OF HIGH INTENSITY OPERATIONAL FLIGHT.—*Quart. Jour. Exper. Physiol. (London)*, 42 (4): 390-397. Oct. 1957. DNLN

Secretory and motor responses of the stomach to a standard 9 a.m. test meal were more marked after 15-hour periods of flight than after corresponding periods of rest (1 subject). Similarly the rate of uropepsinogen excretion during 24-hour periods which included a 15-hour flight was greater than that during corresponding rest periods (13 subjects). It is concluded that these findings are probably attributable, in some measure, to the arduous nature of the experiences encountered and as such have shown themselves to represent physiological effects of fatigue due to high-intensity operational flying. (From the author's abstract) (27 references)

7181

Lukovskii, S. A. 1957
[ON THE BASIC FUNCTIONS OF THE ORGAN OF VISION OF PILOTS IN NORMAL AND COMPLEX METEOROLOGICAL CONDITIONS] Ob osnovnykh funktsiakh organa zreniia u letchikov v prostykh i slozhnykh meteorologicheskikh usloviakh. — *Voenno-meditsinskii zhurnal (Moskva)*, 1957 (11): 56-59. Nov. 1957. In Russian.

DLC (RC970.V55, v. 1957)

The dynamics of visual accommodation were studied in pilots before and after flights in normal and disturbed meteorological conditions. Three types of accommodation changes are distinguished, adjustment, stabilization, and fatigue. During adjustment the ergographic record shows a gradual increase of accommodation; stabilization is characterized by the absence of this effect; and during fatigue the strength of accommodation gradually decreases. Following the first flights in normal and complex meteorological conditions, the change of accommodation is usually toward stabilization; repeated flights produce fatigue.

7182

King, S. H.,
and D. H. Funkenstein
RELIGIOUS PRACTICE AND CARDIOVASCULAR

REACTIONS DURING STRESS.—*Jour. Abnormal and Social Psychol.*, 55 (1): 135-137. July 1957.

DLC (RC321.J7, v. 55)

Correlations between religious practice and attitudes and cardiovascular reactions during acute stress are reported as a part of a larger investigation concerned with the psychological and sociological correlates of physiological reactions during acute laboratory stress. Data on religious practices and attitudes were obtained from a questionnaire and the Religious Conventionism scale of Levinson. Individuals with a nor-epinephrine like cardiovascular reaction to stress tended to direct anger outward to the experimenter, perceived their father as a dominant, stern disciplinarian, had conservative religious attitudes, and came from families with regular church attendance. Subjects who responded to stress with an epinephrine-like reaction tended to direct anger inward or react with anxiety; they perceived their fathers as nondominant in discipline, had moderate to liberal religious attitudes, and came from families with irregular church attendance.

7183

Klein, S. J.
THE MEASUREMENT OF STRESS AND ITS RELATIONSHIP TO PERFORMANCE. I. THE RELATIONSHIP OF MUSCLE ACTION POTENTIALS TO THREE MEASURES OF ERGOGRAPHIC WORK IN TASK ORIENTED SUBJECTS.—*Naval Air Material Center. Air Crew Equipment Lab., Philadelphia, Pa. (Project no. NM 001 110 20). Report no. NAMC-ACEL-326*, Feb. 27, 1957. [27] p. AD 124 330 UNCLASSIFIED

The present experiment was made to determine whether the relationship between stress and performance is dependent upon the manner in which the subject is stressed. MAP (Muscle Action Potentials) were recorded under various conditions and assumed to be measures of systemic stress. Three measures of motor performance in a finger ergographic task were obtained—output, accuracy, and precision of work. The stressors employed were (1) application of cold and warm stimuli to the working hand; (2) slow and fast rate of lift in the ergographic task. The experimental results indicated that the direction of the relationship between stress (MAP) and performance is dependent upon the measure of performance used and not upon how the stress was induced. When viewed with respect to other investigative findings it was conjectured that the relationship between stress and quantity of work may be influenced by the subject's motivation to perform. However, preciseness of work seems to be inversely related to the intensity of the stress, irrespective of how the subject is stressed or the motivating factors influencing his performance. (Author's abstract)

7184

Mefferd, R. B.,
H. B. Hale, and H. H. Martens
METABOLIC RESPONSES OF ADAPTED RATS TO ACUTE STRESS [Abstract].—*Federation Proceedings*, 16 (1, part 1): 87. March 1957. DLC (QH301.F37, v. 16)

Using urinary determinations to indirectly assess metabolic "cost", comparison was made of the effects of: (a) acute exposure to low barometric pressure on rats adapted to cold or to heat; (b) cold or heat on altitude-adapted rats; (c) cold on heat-adapted rats, and (d) heat on cold-adapted rats. Since the magni-

tude of many of the responses shown by adapted animals was similar to that of control animals, it does not appear that the over-all metabolic "cost" for adapted animals was greater than for normal controls. (Authors' abstract, modified)

7185

Mefferd, R. B.,

H. B. Hale, and H. H. Martens

NITROGEN AND ELECTROLYTE EXCRETION OF RATS CHRONICALLY EXPOSED TO ADVERSE ENVIRONMENTS.—School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 57-66, May 1957. 14 p. AD 140 467 PB 130 056

Urinary excretion patterns of adult male Wistar rats exposed for 11 weeks to control (25° C.) or to adverse conditions (5° C., 35° C., or simulated altitude equivalent to 18,000 feet) were determined using 24-hour fasting urine specimens collected weekly during the final 4 weeks. Relative to metabolic body weight, fasting water intake tended to vary directly with temperature, but urinary sodium, potassium, magnesium, calcium, phosphate, urea, valine, and alanine tended to vary inversely with temperature. Creatinine, uric acid, histidine, glycine, serine, methionine, glutamic acid, and aspartic acid excretion tended to vary nonlinearly with temperature. Altitude induced a blanket reduction in urinary constituents. (Authors' abstract) (45 references)

7186

Pokorovski,

STUDY OF THE VITAL ACTIVITY OF ANIMALS DURING ROCKET FLIGHTS INTO THE UPPER ATMOSPHERE.—Royal Aircraft Establishment (Gt. Brit.), Farnborough. Library Translation no. 625, Jan. 1957. 6 p. AD 124 191 UNCLASSIFIED

Translation, by R. C. Murray, of paper presented at the International Congress on Rockets and Guided Missiles, Paris, Dec. 3-8, 1956.

Vital activity of the body at high altitudes was observed in dogs in a hermetically sealed compartment in the nose of a rocket. Equipment carried in the compartment allowed observations to be made on conditions, on the behavior of the animals during flight, and during free fall of the cabin from the rocket. Next the dogs were placed in space suits in a compartment not hermetically sealed. In one case the animal was ejected at about 75 to 85 kilometers, its parachute opened, and it was subjected to all the external influences of the upper atmospheric layers for 50-65 minutes of descent. The other animal was ejected at about 35 to 50 kilometers and its parachute opened at about 4000 meters. No substantial ill effects were observed in the animals, and all arrangements for survival worked satisfactorily. (Authors summary, modified)

7187

Poppen, J. R.

MAN IS BEING ADAPTED TO INCREASING TEMPERATURES.—SAE Journal, 65 (4): 65-67. March 1957. DLC (TL1.S5, v. 65)

Four of the chief barriers to man's ascent to higher altitudes are: (1) reduced barometric pressure, (2) velocity, (3) vision, and (4) radiations. These are discussed as to their physiological effects and means taken for protection against them. The problem of protection of personnel is noted as it relates to the introduction of nuclear power for flight.

7188

Seidman, D.,

S. B. Bensen, I. Miller, and T. Maeland

INFLUENCE OF A PARTNER ON TOLERANCE FOR A SELF-ADMINISTERED ELECTRIC SHOCK.—Jour. Abnormal and Social Psychol., 54 (2): 210-212. March 1957. DLC (RC321.J7, v. 54)

As a part of a program of military research, the presence of a partner was explored for its effect on stress tolerance. Tolerance for electric shock was measured by having each subject increase the shock intensity to the maximum that he could tolerate. Two observations were made for each subject: one when he was alone, and another when a partner apparently shared the electric shock while the subject raised it to his own maximum tolerance level. Analysis of data on 133 enlisted men showed that the tolerance level chosen in the condition including a partner was significantly higher than the level chosen when the man was alone with experimenter. This result was not influenced by order of presentation or week of testing. These findings suggest that the perceived sharing of stress contributes importantly to stress tolerance. (Authors' summary, modified)

7189

Stubbs, R. A.

SPECIFIC AEROMEDICAL PROBLEMS IN HIGH PERFORMANCE AIRCRAFT.—Canad. Services Med. Jour. (Ottawa), 13 (6): 355-362. June 1957. DNLM

The principal medical problems of high-altitude flight are associated with the reduction in total atmospheric pressure, oxygen partial pressure, and ambient air temperatures. Speed *per se* presents no physical problems; however, the time rate of change of speed (acceleration) does. Speed is also responsible for the aerodynamic heating effect of aircraft. The major problem related to both speed and altitude is escape. Research is needed for the development of escape systems, especially automatic ejection seats.

7190

Tabasse, L.

[THE PHYSIOPATHOLOGICAL EFFECTS OF HIGH SPEEDS] Les effets physiopathologiques des grandes vitesses.—In: H. Desoille, Cours de médecine du travail, vol. 2, p. 107-115. Paris, 1957. In French. DNLM (WA400.D467c, v. 2)

Flight at a speed of 100-150 km./hour in the open cockpit causes serious respiratory manifestations (respiratory fatigue, dyspnea); at 200 km./hour, deformities and lesions of the soft parts of the face; at 250 km./hour, possible disconnection of oxygen mask and glasses; at 400 km./hour, impossible respiration; and at 500 km./hour, immobility so that even the slightest activity cannot be performed. Other problems encountered arise from hyperthermia, vibrations transmitted directly to the pilot by aircraft structures or indirectly by the intervening air (infrasound, sonic, ultrasonic), and from rapid pressure variations. High speed affects neurovegetative functions, interferes with visual perception, produces visual illusions, and disrupts sleep, daily biological rhythms, and orientation. For rapid intercontinental flights it is recommended that there be a limitation on the number of work hours in order to prevent rapid fatigue or neuroses.

7191

Tiller, P. R.,

H. R. Greider, and E. Grabiak

EFFECTS OF PILOTS' TASKS ON METABOLIC

RATES.—*Jour. Aviation Med.*, 28 (1): 27-33. Feb. 1957. DLC (RC1050.A36, v. 28)

An experiment was conducted on metabolic rates, minute volumes, and respiratory rates of seven pilots and two nonpilots under simulated conditions of initial rest, take off, combat, emergency, straight and level flight, descent and landing, and final rest. The metabolic rates, respiratory rates, and minute volumes of all subjects increased with the complexity of the task. Significant correlation between metabolic rate and minute volume indicated that minute volume can be employed as a fair index of metabolic rate. Combat pilots exhibited the highest metabolic rate and minute volume in six out of seven conditions tested. (From the authors' summary)

7192

Tracysk, W.

[EOSINOPEIA INDUCED BY THE STIMULATION OF THE HYPOTHALAMIC STRESS CENTER IN RATS] Reakcja eosynopenii przy pobudzeniu tzw. "ośrodku stresu" w podwzgórzu szczurów. — *Acta physiologica polonica* (Warszawa), 8 (3-3a): 551-553. In Polish. DLC (QP1.A27, v. 8)

In normal and adrenalectomized rats, stimulation of the hypothalamus by histamine, 20% NaCl, epinephrine or electric current induce eosinopenia, which does not depend on the number of impulses but on the location of the hypothalamic areas sensitive to these stimuli.

b. Acceleration

7193

Beischer, D. E.,

and G. D. Beischer

GUPPIES IN AVIATION MEDICAL RESEARCH.—*Aquarium*, 26 (9): 327-328. Sept. 1957.

DLC (QH68.A172, v. 26)

Guppies exposed to 50 g in a laboratory centrifuge for 1 minute completely lost their sense of orientation and moved in a corkscrew path, often swimming and resting on their back. Guppies showing this behavior recovered after about 15 minutes and resumed normal swimming patterns. This disorientation phenomenon increased in severity and duration at higher g-forces and longer durations of exposure. At 10,000 g, guppies did not survive an exposure time longer than a half minute. Some fish died after exposure to 7500 g for 1 minute. The experiments confirmed the expectation that fishes in water can be subjected to high g forces since a considerable fraction of these forces is compensated by buoyancy.

7194

Brent, H. P.,

T. J. Powell, and J. W. Scott

THE EFFECT OF POSITIVE ACCELERATION WITH HYPERVENTILATION ON THE EEG [Abstract].—*Electroencephalography and Clinical Neurophysiol.* (Montreal), 9 (2): 378. May 1957. DNLM

Jet fliers in the Royal Canadian Airforce who had shown unexplained periods of brief unconsciousness in flight were examined medically, and observed while subjected to stresses similar to flight stresses; also the circumstances in which the unconscious episode occurred were investigated. Routine electroencephalograms were recorded at rest, during hyperventilation, during positive acceleration and during a com-

bination of hyperventilation and positive acceleration. The studies were made in both the fasting and the postprandial states. EEG was found to be more stable in the postprandial than in the fasting state. In some who showed no slow activity with hyperventilation alone, combination of hyperventilation and positive acceleration induced slow waves. In others who exhibited slow waves with hyperventilation, positive acceleration hastened their onset. It is concluded that the stresses produced by hyperventilation and positive acceleration are additive, and combined may be sufficient to interfere with cerebral function, where either stress alone is not sufficient.

7195

Briessenden, R. F.,

D. C. Cheatham, and R. A. Champine

TOLERABLE LIMITS OF OSCILLATORY ACCELERATIONS DUE TO ROLLING MOTIONS EXPERIENCED BY ONE PILOT DURING AUTOMATIC-INTERCEPTOR FLIGHT TESTS.—National Advisory Committee for Aeronautics, Washington, D. C. NACA Research Memorandum no. L56K20, Jan. 25, 1957. 12 p. AD 255 197 UNCLASSIFIED

Limited flight-test data obtained from an automatically controlled interceptor during runs in which oscillatory rolling motions were encountered have been correlated with the pilot's comments regarding his ability to tolerate the imposed lateral accelerations. The results of this correlation indicate that the tolerable limit of the lateral oscillatory acceleration was about ± 0.4 to ± 0.5 g, measured at the pilot's head in the frequency range from 4 to 9 radians per second. (Authors' summary)

7196

Brown, John L.,

and R. E. Burke

THE EFFECT OF POSITIVE ACCELERATION ON VISUAL REACTION TIME.—Naval Air Development Center. Aviation Medical Acceleration Lab., Johnsville, Pa. (Project no. NM 17 01 12.1, Report no. 4). Report no. NADC-MA-5712, Aug. 12, 1957. iv+21 p. AD 143 551 UNCLASSIFIED

Reaction time to visual test signals was measured for two subjects during exposure to positive acceleration. Two test light luminances, 4560 millilamberts and 0.025 millilambert, and two regions of the retina, one close to the foveal center of the eye and the other far removed from the fovea, were investigated. When measured in terms of a visual effect, acceleration tolerance was higher for the brighter light. It was also higher when the more central region of the retina was stimulated. Reaction time is increased significantly with increases in positive acceleration below the tolerance level. Increase in reaction time does not occur until after a minimum of about 5 seconds exposure to acceleration between 3 and 6 g. (Authors' abstract)

7197

Brown, John L.,

W. H. B. Ellis, M. G. Webb, and R. F. Gray

THE EFFECT OF SIMULATED CATAPULT LAUNCHING ON PILOT PERFORMANCE.—Naval Air Development Center. Aviation Medical Acceleration Lab., Johnsville, Pa. (Project no. NM 11 02 12.2, Report no. 1). Report no. NADC-MA-5719, Dec. 31, 1957. ix+23 p. AD 156 851 UNCLASSIFIED

Four subjects were exposed to acceleration patterns which simulated the accelerations of catapult

launchings up to 11.3 g. Subjects were trained in a task which required stabilization, by manipulation of a control stick, of disturbances of a standard pitch and roll indicator. Scores for performance were obtained during a control period prior to acceleration exposure and immediately following exposure. Performance immediately following exposure showed no decrement at any level of acceleration when compared with performance prior to exposure. Some discomfort at the higher levels of acceleration was attributed to a negative component of acceleration on the subject which was proportional to the sine of the angle formed by the seat-back with the vertical. (Authors' abstract)

7198

Browne, M. K.

ACCELERATIONS IN SPACE MEDICINE.—Space-flight (London), 1 (4): 139-142. July 1957.

DLC (TL787.B725, v. 1)

The physical aspects of acceleration as well as the physiological effects of positive, negative, and transverse g are discussed. The two extremes of acceleration involved in space flight are also discussed. The first is encountered in take-off and ascent where high peak accelerations occur. The second involves the weightless state created in space or coasting freely in an orbit around the earth. The known physiological consequences of these two extremes are described as they relate to the g/time patterns in the first situation and to eating and drinking, the otoliths, and muscular movements in the weightless state. Angular acceleration is also discussed with regard to its physiological effects and rocket design. These main acceleratory problems affecting man in his conquest of space do not present an insurmountable barrier. It appears that other medical problems and those of design will be the factors delaying the take-off of the first space traveler. The limits of human tolerance with regard to intensity and duration of acceleration and the position of the body axes are tabulated.

7199

Browne, M. K.,

and J. T. Fitzsimons

ELECTROCARDIOGRAPHIC CHANGES DURING POSITIVE ACCELERATION, WITH A NOTE ON VECTOR-CARDIOGRAPHY.—R. A. F. Inst. of Aviation Medicine (Gt. Brit.), Farnborough; issued by Flying Personnel Research Committee (Gt. Brit.). Report no. FPRC 1009, June 1957. [2]-17 p.

AD 141 045

UNCLASSIFIED

In the human centrifuge, 53 subjects carried out 366 fully instrumented runs under positive accelerations of 3-5 g. The results were analyzed for pulse rates, pulse rate intervals, and changes in the electrical axis. Some vector-cardiograms were also recorded. No abnormal rhythms were found and the only abnormal pattern was in a subject who lost consciousness at 4 g. Differences in cardiovascular response to g were found between experienced and inexperienced subjects; these were maximal at low g values and disappeared as the g level increased. Unconsciousness causes muscle artefacts in the limb leads and T-wave changes which, however, require cautious interpretation. Analysis of the electrical axis indicates definite trends under g but these are overshadowed by the effect of respiration. Positional changes are complex and cannot be dissociated from respiration. Vector-cardiograms were easily carried out and gave reproducible results but were

of little value in studying the heart during positive acceleration. (Authors' summary)

7200

Browne, M. K.

METHOD OF THRESHOLD DETERMINATION IN THE HUMAN CENTRIFUGE.—RAF Inst. of Aviation Medicine (Gt. Brit.), Farnborough; issued by Flying Personnel Research Committee (Gt. Brit.). Report no. FPRC 1029, Dec. 1957. 9 p. AD 209 986

UNCLASSIFIED

A method of threshold determination is described which utilizes visual blackout as the end point. Thresholds can be varied at will by the use of suitable filters. The method is capable of precise specification and is easily performed. A plea is made for the use of rates of application having a linear acceleration/time relation. These, when of low value, allow cardiac compensation during the rise and obviate the use of repeated plateau runs with their concomitant fatigue. (Author's summary)

7201

Cohen, S. I.,

A. J. Silverman, G. Zuidema, and C. Lazar

PSYCHOTHERAPEUTIC ALTERATION OF A PHYSIOLOGIC STRESS RESPONSE. — Jour. Nervous and Mental Disease, 125 (1): 112-118. Jan.-March 1957.

DLC (RC321.J63, v. 125)

The influence of specific emotional factors on cardiovascular responses to the human centrifuge is reviewed. A case is presented in which the patient's tolerance to centrifugal stress is lowered because of acute anxiety. The therapeutic approach used to alter his affect state is described. The amelioration of anxiety and the arousal of aggressive feelings result in an increase in his cardiovascular stress tolerance. The relationship of central nervous system, vascular, and neurohormonal mechanisms to affect state changes is discussed. (Authors' summary)

7202

Fukuda, T.,

M. Hinoki, and T. Tokita

PROVOCATION OF LABYRINTHINE REFLEX BY VISUAL STIMULI.—Acta oto-laryngologica (Stockholm), 48 (5-6): 425-432. Nov.-Dec. 1957. In English.

DNLM

The authors relate experiments to show that the labyrinth is stimulated by the so-called subliminal rotation and reacts to promote the optokinetic nystagmus. The perrotatory nystagmus is not induced only because the subject is under a special visual condition.

7203

Guedry, F. E.,

and N. Beberman

APPARENT ADAPTATION EFFECTS IN VESTIBULAR REACTIONS.—Army Medical Research Lab., Fort Knox, Ky. (AMRL Project no. 6-95-20-001). Report no. 293, Jan. 1957. ii+14 p. AD 141 108

UNCLASSIFIED

Angular decelerations of different magnitudes were applied for times calculated to produce theoretical cupula deviations which would be equal for all decelerations. The results clearly demonstrate an inverse relationship between deceleration duration and the primary subjective response duration after termination of the deceleration. Habituation effects were

apparently absent in this experiment. A second experiment demonstrated that a 2 deg/sec² deceleration maintained for a variety of intervals yields responses predicted by the 'torsion pendulum' theory up to a deceleration duration of approximately 15 seconds. Beyond this point, even though there would be an increase in theoretical cupula deviation with longer deceleration durations, there was an inverse relationship between deceleration duration and post-deceleration response duration. These experiments show that apparent adaptation effects manifest themselves during a prolonged vestibular reaction and provide information concerning the rate of growth of this adaptation process. (Authors' results and conclusions)

7204

Guedry, F. E.,

L. J. Peacock, and R. L. Cramer

NYSTAGMIC EYE MOVEMENTS DURING INTERACTING VESTIBULAR STIMULI.—Army Medical Research Lab., Fort Knox, Ky. (USAMRL Project no. 6-95-20-001). Report no. 275, March 25, 1957. i+8p. AD 129 449 UNCLASSIFIED

Where angular acceleration is immediately followed by angular deceleration, the vestibular reaction initiated by the acceleration extends temporally into the deceleration period. The interval between the commencement of deceleration and the termination of the vestibular nystagmus initiated by the acceleration, i.e., the interval t_r , varies systematically with changes in the magnitude of the deceleration. The results obtained on vestibular nystagmus in the present experiment were essentially the same as those obtained where subjective reports were recorded. The results of the present study and the results of the previous study in regard to the interval t_r show a close correspondence to the theoretical curves derived from the "torsion pendulum" theory. However, both sets of data show a slight but consistent tendency to fall above the theoretical curve, i.e., the obtained responses were slightly longer than the expected responses. (Authors' summary and conclusions)

7205

Guedry, F. E.

SOME EFFECTS OF INTERACTING VESTIBULAR STIMULI.—Army Medical Research Lab., Fort Knox, Ky. (USAMRL Project no. 6-95-20-001). Report no. 261, March 18, 1957. ii+14p. AD 125 588 UNCLASSIFIED

This is a study of the subjective vestibular reaction to a positive angular acceleration followed by negative angular acceleration without an intervening period of constant angular velocity. One phase of the subjective experience, which theoretically is indicative of the response of the vestibular system while it is being driven, showed systematic change with variation in the independent variable. A second phase of the subject experience, which theoretically is indicative of the recovery of the vestibular system after the stimulus is removed, was more variable, and is much less predictable than the first. It is suggested that the vestibular response is consistent and predictable where stimuli approximate conditions of motion encountered under normal living conditions. (Authors' abstract) (21 references)

7206

Herrick, R. H.,

J. L. Myers, and R. E. Burke

DISCRIMINATIVE BEHAVIOR FOLLOWING RE-

PEATED EXPOSURE TO NEGATIVE ACCELERATION.—Naval Air Development Center, Aviation Medical Acceleration Lab., Johnsville, Pa. (Project no. NM 11 01 12.8, Report no. 3). Report no. NADC-MA-5716, Nov. 26, 1957. iv+9 p. AD 156 852 UNCLASSIFIED

Rats were first acclimated for two weeks to a food-deprivation schedule, then trained to perform a simple light-dark discrimination task, and finally repeatedly exposed to negative acceleration (increased by 1 g unit at five-day intervals). It was concluded that: (a) the physiological changes resulting from exposure to negative acceleration had relatively little effect upon discriminative behavior, and (b) repeated exposure to negative g permits survival at exposure to higher negative g values.

7207

[HUMAN TOLERANCE TO LINEAR DECELERATIONS]

La tolérance humaine aux décélérations linéaires.—Force aérienne, Service de santé, Bulletin technique d'information [Bruxelles], 1957 (Dec.): 1. In French DNLM

Four subjects attached by different types of harnesses to an ejectible sled fixed to a vehicle on a rail propelled by rockets were subjected to deceleration tests of 0.2-0.4 seconds. Using a conventional harness with two outer straps, V-inverted, and attached to the center of the abdomen and base of the foot, the body was able to tolerate 17 g. By adding an apparatus for stabilizing the legs to the harness, 20 g was tolerated. If, instead of the conventional harness, a special retention vest with an apparatus for holding the legs, arms, and head was used, 25 g was tolerated.

7208

Isakov, P. K.

[PHYSIOLOGICAL REACTIONS OF MAN UNDER THE INFLUENCE OF RADIAL ACCELERATIONS]

Fiziologicheskie reaktsii cheloveka pri deistvii radial'nykh uskoreniy. — Voenno-meditsinskii zhurnal (Moskva), 1957 (6): 65-72. June 1957. In Russian. DLC (RC970.V55, v. 1957)

Certain physiological effects of radial acceleration are discussed which are of a practical significance in aviation. The phenomenon of grayout and blackout under positive acceleration is well known; it is caused by a reduction of the retinal and cerebral circulations due to the redistribution of the blood in the body. Repeated exposure to acceleration may result in a certain degree of adaptation which manifests itself in increased tolerance of the intensity or duration of acceleration. Compensatory mechanisms, which tend to counteract the shifting of the blood, are chiefly of a muscular nature (increased tonus) and may be demonstrated in the electromyogram. Such reactions occur even in anticipation of acceleration. The duration and accuracy of hand movements during acceleration was also studied, as well as the oxygen consumption before, during, and after acceleration with and without the use of anti-g devices.

7209

Kelly, C. F.,

A. H. Smith, and C. M. Winget

PHYSIOLOGICAL RESPONSES TO ARTIFICIAL ALTERATIONS IN WEIGHT.—Univ. of California, Berkeley (Contract Nonr-2211(01), Office of Naval Research Project no. 102-448). Annual Progress

Report no. 2 (for the period: April 15-Dec. 15, 1957), Dec. 15, 1957. 30 p. AD 150 390 UNCLASSIFIED

Chickens can survive accelerative forces up to 4 g, with considerable mortality and growth repression. Up to 2.5 g, appears to have little effect (i.e., normal growth and negligible mortality). No definite syndrome was established for birds dying while exposed to an accelerative force. Although neurological disturbances were encountered (and proven not to result from infectious disease) these were not considered to be primary causes of death in acceleration stress. Birds grown under an accelerative force showed some anatomic changes. Consistent changes were observed in heart rate (increased) and respiratory frequency (decreased). On return to normal gravity, the physiological differences between centrifuged birds and their controls disappeared in about 3 weeks. In some cases there was a period of overcompensation (viz.: respiratory frequency which decreased in centrifugation, became faster than in the controls during the first two weeks at normal gravity). Some progress was made on the development of a high-g strain. The first selection (involving a 60% mortality) was made, and this group will be reproduced in the near future. (Authors' abstract, modified)

7210

Kydd, G. H.,
and A. M. Stoll

G TOLERANCE IN PRIMATES. I. UNCONSCIOUSNESS END POINT.—Naval Air Development Center. Aviation Medical Acceleration Lab., Johnsville, Pa. (Project no. NM 11 01 12.9, Report no. 1). Report no. NADC-MA-5717, Dec. 11, 1957. iv+16 p. AD 156 855 UNCLASSIFIED

In this study unanesthetized monkeys have been observed during centrifuge runs of from 2.8 to 15.6 positive g for periods up to 3 minutes. An end point was found which serves to separate the initial period of activity from that which occurred later during the run. It provides a convenient means for investigating the effect of the initial rate of application of g on the tolerance time. The curve resulting from the plot of the end points with respect to maximum g and time from the onset of g parallels the human tolerance curve with respect to unconsciousness. The establishment of a constant relationship between these curves constitutes the first step in the systematic correlation of animal and human experimentation. (Authors' abstract)

7211

Kylstra, J.

THE USE OF U-EFFECT IN PHYSIOLOGICAL RESEARCH: MEASUREMENT OF ACCELERATIONS.—In: The first European congress of aviation medicine, p. 159-170. Aeromedica acta (Soesterberg, Netherlands), Special edition, 1957. In English. DNLM

A description is presented of the design for a simple, highly sensitive accelerometer which can detect vibrations in the range of less than 1 up to 3000 c.p.s. and acceleration forces as low as .01 g. The principle employed is the so-called U-effect—the appearance of electropotentials in a non-metallic tube filled with mercury in diluted sulfuric acid, whenever small accelerations are directed along the longitudinal axis of the system. Applications of such apparatus to study of the heart action, blood pressure, circulation, and motion are illustrated. Phenomena similar to the U-effect may exist in nature in the semicircular canals of the vestibular system.

7212

Latham, F.

LINEAR DECELERATION STUDIES AND HUMAN TOLERANCE.—R. A. F. Inst. of Aviation Medicine (Gt. Brit.), Farnborough; issued by Flying Personnel Research Committee (Gt. Brit.). Report no. FPRC 1012, June 1957. i+15 p. AD 141 044

UNCLASSIFIED

The limits of physiological tolerance to linear deceleration lasting 0.2 to 0.4 second have been assessed for subjects wearing four types of Service torso-restraining harnesses without limb restraint. A combined harness alone, which is proposed for use in Service aircraft, should give protection up to 17 g, but above this figure serious injury is likely. If additional leg-restraint is employed, it is considered that the safe limit may be raised to at least 20 g. Above this figure arm, leg, and head restraint, and a jerkin harness should give protection up to 25 g. Attention is drawn to the possible mechanism of injury to the larynx, face and chest. Peak intra-abdominal pressures of 450 mm. Hg at 12 g have been recorded in a test subject. When the test subjects were relaxed prior to impact a protective extensor response in the lower limbs tending to brace the subject against the rudder pedals was not detected less than 100 milliseconds after impact. (Author's summary)

7213

Lawton, R. W.,

G. H. Kydd, L. C. Greene, and R. J. Crosbie
ARTERIAL BLOOD PRESSURE RESPONSES TO ABRUPT POSITIVE ACCELERATION.—Naval Air Development Center. Aviation Medical Acceleration Lab., Johnsville, Pa. (Project no. NM 001 100 315, Report no. 4). Report no. NADC-MA-5704, March 1, 1957. v+15 p. AD 127 902 UNCLASSIFIED

This study describes arterial blood pressure responses in 12 anesthetized monkeys exposed to abrupt, positive acceleration produced by a 90° rotation of an animal board mounted on a small 8-foot centrifuge. The time constant for the exponential fall in carotid blood pressure was determined; its average value was 0.34 sec.⁻¹. Extrapolated log pressure-time curves yielded an average intercept of -0.2 second, suggesting the absence of a finite lag period in the carotid pressure response. Changes in arterial distensibility were suggested by measurements of pulse wave velocity. The data are discussed in terms of a simple hydraulic analogue. (Authors' abstract)

7214

Leverett, S. D.,

and G. D. Zuidema

STANDARDIZATION OF HUMAN CENTRIFUGE TECHNIQUES.—Meddelanden från flyg- och navalmedicinska nämnden (Stockholm), 6 (2): 33-39. 1957. In English. DNLM (W1SW387, 1957)

Standardization of experiments conducted in different centers on human centrifuges is proposed along the following criteria: (1) Rate of onset 1.5 g/sec.; (2) Maximum time at peak g in a rapid onset run, 15 sec.; (3) lights in room, darkened or dimmed; (4) distance from subject's eyes to light panel, 30 inches; (5) distance between right and left peripheral lights, 28 inches; (6) type lights for subject, to be determined (however, some standard white light would be most desirable); (7) central observer, this is definitely desirable; (8) television monitor, optional, but

desirable; and (9) end-point criteria, blackout (peripheral light loss, central light loss) at any point in the run. Certain other recommendations are made. (From the authors' conclusions)

7215

Leverett, S. D.,
S. Bondurant, and M. B. Riley
VENOUS CONSTRICTION IN MAN DURING EXPOSURE TO POSITIVE G FORCE [Abstract].—Federation Proceedings, 16 (1, part I): 80. March 1957.
DLC (QH301.F37, v. 16)

Five subjects were studied during 15-second exposure to 3 g (positive) on the human centrifuge. Pressure in the venous segment isolated between two occlusive pneumatic tourniquets increased in every instance beginning 1-10 seconds after the onset of acceleration. It reached a peak after 10-30 seconds and slowly returned to the original level during the subsequent 20-45 seconds. The group mean maximum pressure increase was 12.5 ± 4.8 mm. Hg. Reflex venous constriction occurred during positive acceleration, presumably contributing to circulatory compensation. The functional significance of this reflex remains to be determined. (Authors' abstract, modified)

7216

Lewis, S. T.,
and J. P. Stapp
A CRASH-RESTRAINT DEMONSTRATOR.—Holloman Air Development Center. Aeromedical Field Lab., Holloman Air Force Base, New Mexico. Report no. HADC TN 57-9, June 1957. iii+14 p. AD 123 733
PB 128 416

Human-volunteer subjects were exposed to a deceleration of 5 g in the forward- and backward-facing seated positions on the crash-restraint demonstrator. Time studies were made beginning at the instant of seat deceleration to successful escape from the seat. A total of 48-runs was accomplished, with 24 in the forward-facing position and 24 in the backward-facing position. Results are presented on the subjects' escape time from the forward- and from the backward-facing positions. Results are discussed, and an improved model of the original decelerator which will be utilized in future experiments is described. (From the authors' abstract)

7217

Lewis, S. T.,
and J. P. Stapp
EXPERIMENTS CONDUCTED ON A SWING DEVICE FOR DETERMINING HUMAN TOLERANCE TO LAP BELT TYPE DECELERATIONS.—Air Force Missile Development Center. Directorate of Research and Development, Holloman Air Force Base, New Mexico (Project no. 7850). AFMDC TN no. 57-1, Dec. 1957. ii+21 p. AD 135 005
PB 135 420

Anthropomorphic dummies and human volunteer subjects were decelerated while seated in a swing-seat device, facing forward, and being restrained by lap belts three inches wide. The swing consisted of an aircraft seat, suspended by cables forming a swing-pendulum, which could be raised and dropped through a measured vertical component and arrested by a steel cable. Rate of onset, magnitude, and duration are tabulated for 21 dummy tests and 19 human tests. (Authors' abstract)

7218

Libber, L. M.
SOME THRESHOLDS OF INJURY FROM APPLICATION OF HIGH LINEAR ACCELERATIVE FORCES TO RATS.—Jour. Aviation Med., 28 (2): 166-170. April 1957
DLC (RC1050.A36 v. 28)

Deceleration tests were made on 96 rats to determine bone fracture, corneal reflex loss, intraventricular hemorrhage, and subdural hemorrhage thresholds for instantaneous peak g forces and for extended g forces. The rats were embedded in plaster on a pendulum arrangement and subjected to high decelerative g forces when the pendulum struck an arresting block. The levels of g obtained were approximately 150, 225, 300, and 400 g lasting for about 4-8 milliseconds. Increasing the duration of applied g forces lowered the bone fracture and corneal reflex loss thresholds, but had little effect on the intraventricular or subdural hemorrhage thresholds. The sequence of injury occurring with increasing g level is probably: intracranial and intraventricular hemorrhage, fracture, and loss of corneal reflex.

7219

Markarian, S. S.
[THE RELATION BETWEEN THE ACUITY OF AUTONOMIC REACTIONS AND THE DURATION OF ANTIROTATORY ILLUSIONS DURING THE STIMULATION OF THE VESTIBULAR ANALYSER] O sootnoshenii vyrazhennosti vegetativnykh reaktsii i prodolzhitel'nosti illiuzii protivovrashcheniia pri razdrasheni vestibuliarnogo analizatora [Abstract].—Voenno-meditsinskii zhurnal (Moskva), 1957 (7): 81. July 1957. In Russian. DLC (RC970.V55, v. 1957)

The duration of post-rotational nystagmus induced by rotation in a chair varied in the same individuals and was not consistent with the time and duration of contrarotational illusions. The degree of autonomic and somatic responses was not always related to the postrotational nystagmus. When such a relation existed, it was a definite one: the longer the contrarotational illusion, the more pronounced were the responses.

7220

[RADIAL ACCELERATIONS TOLERATED DURING ACROBATIC FLIGHT AND COMBAT MANEUVERS] Accélérations radiales supportées au cours de figures acrobatiques et de manoeuvres de combat.—Force aérienne, Service de santé, Bulletin technique d'information [Bruxelles], 1957 (Aug.): 6-8. In French. DNLM

The accelerations tolerated by a pilot during acrobatic flight or combat maneuvers vary not only with the technique of the pilot, but also with the type of plane and speed with which the maneuvers are carried out. Included is a tabulation of g tolerated during various maneuvers.

7221

Schindl, K.
[THE EFFECT OF AIRCRAFT SPINS ON THE HUMAN BODY] Einwirkung des Trudelvorganges auf den menschlichen Körper.—Zeitschrift für Flugwissenschaften (Braunschweig), 5 (8): 221-227. Aug. 1957. In German, with English summary (p. 221).
DLC (TL503.W557, v. 5)

The effects of the radial and angular accelerations generated in a spin of an aeroplane on the human body are discussed. The danger from radial and angular accelerations is threefold: (1) the impairment of free movements of body and limbs, the

weight of which is increased many times as the result of acceleration, (2) the impairment of vision and consciousness due to impeded cerebral circulation at certain positions of the body during the spin, and (3) the impairment of the sense of direction because of incompatible information from the visual senses and the vestibular system. The receptors in these organs are greatly overstimulated by the angular accelerations of the spin. Certain prophylactic measures are reviewed. (Author's summary, modified)

7222

Shirley, R. E.

STANDARDS FOR ACCELERATION. — In: Symposium: physical standards and selection, p. 135-139. Randolph Air Force Base, Tex.: Air University, 1957. AD 144 144 UNCLASSIFIED

The effects of application of g-force are briefly discussed. The method of determination of g tolerance using a centrifuge is described. At the present time it is noted that few Air Force personnel are g intolerant or susceptible. It is also noted that the mood of the patient or experimental subject is important in production and maintenance of g tolerance. The accomplishment of a proper M-1 maneuver is stressed. A simple, easily done, and apparently accurate test for prediction of g tolerance has been devised. This test can be done by any trained medical corpsman. It is strongly suggested that this, or some similar test be included in the examination of pilot trainees so that subjects who do not possess a physiological adaptation to increased intrathoracic pressure may be tested on the centrifuge for g tolerance before a large amount of training time and money have been invested in these personnel. (Author's summary and conclusions)

7223

Silverman, A. J.,

S. I. Cohen, G. D. Zuidema, and C. S. Lazar
PREDICTION OF PHYSIOLOGICAL STRESS
TOLERANCE FROM PROJECTIVE TESTS: "THE
FOCUSED THEMATIC TEST."—*Jour. Projective
Techniques*, 21 (2): 189-193, June 1957.
DLC (BF698.J65, v. 21)

A thematic-type test focused on the area of the direction of and comfort in handling aggressive stimuli and situations was used to predict the g tolerance of three groups of subjects. Adrenaline/noradrenaline ratios, anger-in/anger-out directions of aggression, and blood-pressure patterns were integrated on a basis for predicting g-stress tolerance from projective tests. It was predicted that high g-stress tolerance would relate to outward aggression, while low tolerance would relate to aggression toward the self. G-stress tolerance was determined in a human centrifuge and direction of aggression was elicited with a T.A.T.-like story test. In a preliminary sample, two psychologists independently made correct placements of 12 out of 13 subjects that were selected from the extremes of the distribution of g tolerances, from the stories told to the Focused Projective Tests. High g-stress tolerance subjects tell of heroes who take an obdurate, aggressive, and impulsive role. Low g-stress tolerance subjects tell of heroes who are dependent, inhibited, and controlled by others. Two further validation studies in which the judges predicted the high/low g tolerances from the stories of the Focused Thematic Tests were significant at the .01 level for the first group which was

an Air Force population, and significant at the .05 level for the second group, a student population. (Authors' summary)

7224

Silverman, A. J.,

S. I. Cohen, and G. D. Zuidema
PSYCHOSOMATIC FACTORS IN BLACK-OUT. — *Jour.
Nervous and Mental Disease*, 125 (1): 64-68, Jan.-
March 1957. DLC (RC321.J83)

On the basis of observations of behavior and interviews of 15 jet and propeller-type aircraft pilots, a psychosomatic factor is identified in tolerance to g-forces. Aggressive feelings appear to be related to increased tolerance, while anxiety is associated with lower black-out levels. The possible relationship of these factors to adrenaline/noradrenaline levels and hence to g-tolerance is discussed. (Authors' summary, modified)

7225

Stapp, J. P.,

and W. C. Blount

EFFECTS OF MECHANICAL FORCE ON LIVING
TISSUE. III. A COMPRESSED AIR CATAPULT FOR
HIGH IMPACT FORCES. — *Jour. Aviation Med.*, 28
(2): 281-290, June 1957. DLC (RC1050.A36, v. 28)

A short-track catapult and water braking facility is used to study the physiological effects of decelerative forces from 5 g at 100 g/sec. to 90 g at 12,000 g/sec. Animal subjects with the spinal column oriented parallel to the deceleration vector endured 92 g for 0.11 second without adverse consequences. Human subjects oriented with the vertebral column at 60° to the acceleration vector sustained a deceleration of 10 g for 0.083 sec., without physical discomfort. (Authors' summary, modified)

7226

Stapp, J. P.

HUMAN TOLERANCE TO DECELERATION. — *Amer.
Jour. Surg.*, 93 (4): 734-740, April 1957.
DLC (RD1.A37, v. 93)

Research on the safety and salvage aspects of accidents is described involving the exposure of living organisms to predetermined configurations of mechanical force. Instruments used in these studies are described. Permutations were made of such factors as: (1) orientation of the body with respect to the direction of linear decelerative force, (2) rate of application of force, (3) magnitude of deceleration, and (4) duration of application. It is concluded that the structural strength of the human body, its energy-absorbing characteristics with respect to brief applications of high dynamic loads, and its tolerance to abrupt wind blast of nearly explosive violence facilitate salvaging victims of high-speed transportation accidents. The application of this knowledge can lead to a great saving of lives and prevention of disabilities.

7227

Strollo, M.

[TREND OF BIMANUAL COORDINATION IN SUBJECTS EXPOSED TO DECELERATION AFTER ANGULAR ROTATION] Andamento della coordinazione bimanuale in soggetti sottoposti a decelerazione dopo rotazione angolare. — *Rivista di medicina aeronautica* (Roma), 20 (4): 641-663, Oct.-Dec. 1957. In Italian, with English summary (p. 661).

DLC (RC1050.R56, v. 20)

Thirty subjects of a mean age of 27 years performed a bimanual coordination test to evaluate their tolerance to deceleration following angular rotation. Studies were made with a modified Casella's chron-accelerograph connected to an instrument for the free bimanual coordination test. Tolerance was ascertained from two basic values, (1) the time which elapsed from the moment of deceleration to the moment of task performance, and (2) changes in task performance deduced from the number of errors and from the observed behavior. This test is valuable in presenting relative data of personal psychophysical characteristics, under the stress of brisk deceleration, which are essential for piloting and for ascertaining positive or negative qualities for selection of flying personnel. It also constitutes an efficient instrument for objective training by an exact determination of a candidate's capacities.

7228

Svorad, D.

[THE INHIBITING EFFECT OF STRONG ACCELERATIONS ON THE ACTIVITY OF THE BRAIN AND ITS ELECTROENCEPHALOGRAPHIC MANIFESTATION: A CONTRIBUTION TO THE SO-CALLED ANIMAL HYPNOSIS] Der hemmende Einfluss starker Beschleunigungen auf die Tätigkeit des Gehirns und ihre elektroencephalographische Auswirkung: Ein Beitrag zur sog. Hypnose der Tiere.—Naturwissenschaften (Berlin), 44 (9): 291. May 1957. In German. DLC (Q3.N7, v. 44)

If a vertebrate animal is subjected to rapidly accelerated and then abruptly decelerated rotatory motion 180° about its vertebral axis, it remains akinetic on its back. Electroencephalographic investigations of the phenomenon with frogs and rabbits show that (a) the duration of paroxysmal motor inhibition is directly dependent on the angular acceleration employed, and (b) akinesis due to vestibular stimulation is a result of generalized inhibition of all areas of the cerebral hemispheres, not only of the motor areas.

7229

Usachev, V. V.

[THE EFFECT OF RADIAL ACCELERATIONS ON THE WORK MOVEMENTS IN PILOTS] O vliyanii radial'nykh uskosenii na rabochie dvizheniia letchikov [Abstract].—Voenno-meditsinskii zhurnal (Moskva), 1957 (7): 81. July 1957. In Russian. DLC (RC970.V55, v. 1957)

The time and motion patterns during exposure to radial accelerations were filmed and oscillographically recorded. The acceleration produced constant motion changes, most pronounced in the arm motion against the centrifugal force and least pronounced perpendicular to the force. Pressure suits decreased such deviations, and decreased oxygen deficit. These experiments can serve as a practical basis for locating levers and pedals in the planes.

7230

Woellner, R. C.

THE PERCEPTION OF VERTICAL IN THE PRESENCE OF INCREASED ACCELERATIVE FORCES.—Naval School of Aviation Medicine, Pensacola, Fla. (Research Project no. NM 17 01 11, Subtask 1). Report no. 45, Oct. 31, 1957. 11+15 p. UNCLASSIFIED

Nine normal subjects were tested for their estimations of vertical and body axis when tilted to the side

in a tilting chair and when exposed to a change in direction and magnitude of resultant force on a human centrifuge. It was found that the estimation of vertical lay close to the true vertical on the tilt chair and close to the angle of resultant force on the centrifuge. The constant error in both cases lay toward the subject's body axis, consistently but not significantly, and was very slightly greater under increased resultant force on the centrifuge. The estimation of body axis had considerable deviation in each subject and also varied considerably from subject to subject. (Author's abstract)

7231

Yudkofsky, P. L.

CLOSED-CIRCUIT TELEVISION FOR STUDY OF MICROCIRCULATION DURING CENTRIFUGATION [Abstract].—Federation Proceedings, 16 (1, part 1): 140. March 1957. DLC (QH301.F37, v. 16)

Anesthetized golden hamsters (*Mesocricetus auratus*) were mounted on the human centrifuge and the small blood vessels of the cheek pouch observed at high magnifications by means of a microscope and closed-circuit television combination. Magnifications of 430x at the camera and 900x on the screen were achieved with this apparatus during accelerations up to 12 g. The image was remarkably steady during multiple g runs at lower magnifications. Changes in vessel caliber and flow were observed and the TV image was photographed. (Author's abstract, modified)

7232

Zuidema, G. D.,

A. J. Silverman, S. I. Cohen, and M. Goodall
CATECHOL AMINE AND PSYCHOLOGIC CORRELATES OF VASCULAR RESPONSES.—New England Jour. Med., 256 (21): 976-979. May 23, 1957. DLC (R11.B7, v. 256)

Experiments attempting to relate specific vascular responses with psychologic events through hormonal mediation are described. Seven subjects received a mild hypotensive stimulus via subcutaneous injections of 5 milligrams of methacholine. Six of them were given a massive, hypotensive effect on the human centrifuge. The actual blackout level was taken as a direct measure of the subject's vascular response. Affect states through interviews and catechol amine outputs by urinary assays were taken after both experiments. The results indicate that: (1) changes in specific emotional states are associated with variations in catechol amine levels and in vascular responses, and (2) there appears to be some specificity in the type of vascular response associated with the differential release of these amines, and this is related to the arousal of specific emotional states and the activation of perhaps specific neurophysiologic circuits.

c. Subgravity

7233

Bugelski, B. R.

THE BEHAVIORAL ASPECTS OF WEIGHTLESSNESS. I.—Cornell Aeronautical Lab., Inc., Buffalo, N. Y. (Contract AF 29(600)-1334); issued by Holloman Air Development Center, Holloman Air Force Base, N. M. Report no. 0-1186-V-1, Nov. 1957. vii+41 p. DNLM (WD720.9C814b, 1957)

An evaluation is presented of the literature pertaining to the capacities of organisms to adjust to space conditions, especially to weightlessness. Investigations and experience show that various species and classes (turtles, rats, monkeys, and man) survived brief periods of weightlessness as approximated in aircraft and rockets. Human pilots in aircraft exhibited varying degrees of effectiveness up to about 20 seconds of weightlessness. Animals survived brief space journeys, but beyond the survival of anesthetized monkeys and some apparently successful "holding on" behavior in rats, no data relating to successful reactions to signals or displays are available. A research program is proposed which would utilize both rats and monkeys as experimental research subjects in rocket flight.

7234

Gerathewohl, S. J.,
and H. D. Stallings
THE LABYRINTHINE POSTURE REFLEX (RIGHTING
REFLEX) IN THE CAT DURING WEIGHTLESSNESS.
—*Jour. Aviation Med.*, 28 (4): 345-355. August 1957.
DLC (RC1050.A36, v. 28)

Four young kittens, lacking a developed righting reflex, and four older kittens, with the reflex well established, were used in this experiment. On the ground, the animals were dropped in upside-down position from a height of about 20 inches, and later in the air exposed to periods of 20 to 30 seconds of practical weightlessness. These experiments were conducted with the animals in both blindfolded and non-blindfolded conditions. On the ground, the younger animals fell straight down; the older ones turned upright immediately after release without exception. In the air, the younger kittens floated upside-down during weightlessness; the older ones turned upright at the beginning of the weightlessness state, but their reflex failed after about 20 seconds of exposure. Available visual cues did not affect essentially the reflex pattern. (Authors' summary, modified.)

7235

Gerathewohl, S. J.,
O. L. Ritter, and H. D. Stallings
PRODUCING THE WEIGHTLESS STATE IN JET
AIRCRAFT.—*School of Aviation Medicine, Randolph
Air Force Base, Tex. Report no. 57-143, Aug. 1957.*
11 p. AD 149 703 PB 132 775

Some simple arithmetic functions were used for computing duration, height, and angle of climb of flight parabolas for producing the weightless state in jet aircraft. The results, based upon certain flying characteristics of the T-33, F-94, and F-104, are in good agreement with the data obtained for the first two types of aircraft mentioned during actual zero-gravity maneuvers. Certain flying safety hazards were noticed in the T-33 but remedied through appropriate measures. The F-94C Starfire proved to be superior to the T-33 with regard to safety and duration of weightlessness obtained. If the F-104 were made available for aeromedical research, weightlessness could be produced for more than 1 minute. (Authors' abstract)

7236

Gerathewohl, S. J.,
H. Strughold, and H. D. Stallings
SENSOMOTOR PERFORMANCE DURING WEIGHT-
LESSNESS.—*Jour. Aviation Med.*, 28 (1): 7-12. Feb.
1957. DLC (RC1050.A36, v. 28)

A series of experiments was performed to study eye-hand coordination and adaptation at 3 g, 1 g, and 0 g. Subgravity and zero-gravity states were produced for durations in excess of 10 seconds by flying dives at high altitudes in a T-33A type aircraft. The results of a simple aiming test obtained from seven subjects showed that eye-hand coordination is moderately disturbed by increased or decreased acceleration. (Authors' summary and conclusions, modified)

7237

Gerathewohl, S. J.
WEIGHTLESSNESS.—*Astronautics*, 2 (4): 32-34,
74-75. Nov. 1957. DLC (TL787.A8, v. 2)

The responses of 47 subjects to short periods of weightlessness in parabolic flight were studied. Reactions of test subjects were highly individualistic. While about half the subjects felt comfortable during weightlessness, and reported no sensations of motion other than a slight elation associated with the feeling of exhilaration and pleasantness, several others described sensations of motion with no emotional involvement. A third group experienced discomfort, nausea, and severe symptoms of motion sickness. Included is a table showing the distribution of the 47 tested subjects with regard to attitude prior to flight, psychological reactions, physiological symptoms, and autonomic disturbances.

7238

Lomonaco, T.,
A. Scano, M. Stollo, and F. Rossanigo
[SOME PHYSIO-PSYCHIC EXPERIMENTAL DATA
ON THE EFFECTS OF ACCELERATIONS AND SUB-
GRAVITY PREDICTED FOR MAN LAUNCHED INTO
SPACE] Alcuni dati sperimentali fisiolo-psichici sugli
effetti delle accelerazioni e della sub-gravità previsti
nell'uomo lanciato nello spazio.—*Rivista di medicina
aeronautica (Roma)*, 20 (3): 363-390. July-Sept.
1957. In Italian, with English summary (p. 385-386).
DLC (RC1050.R56, v. 20)

Thirty subjects with normal labyrinthine functions were exposed to accelerations ranging from +3 g (for fractions of a second) to zero g (4 seconds) in a 14-meter-high subgravity tower. The eye-hand coordination was studied by means of an aiming test. Slight but well defined motor incoordination was observed. During weightlessness the majority of subjects experienced a lifting sensation or a feeling of levitation, an increase in muscle tonus, and various unpleasant sensations. Five subjects exposed to several consecutive runs showed an improvement in coordination performance and less severe subjective sensations, indicating an adaptation to the experimental conditions. In 10 subjects, most of whom had already been exposed to the latter experiment, the CF and CF₅ leads of the electrocardiogram during controlled apnea before, during, and after gravity variations showed a marked increase in heart rate which rapidly returned to normal. The coordination test was repeated on five deaf-mute subjects whose labyrinthine function was completely failing, and demonstrated good eye-hand coordination during the tower experiments.

7239

Schack, G. J. D.,
and D. G. Simons
A TECHNIQUE FOR INSTRUMENTING SUB-GRAVITY
FLIGHTS.—*Jour. Aviation Med.*, 28 (6): 576-582.
Dec. 1957. DLC (RC1050.A36, v. 28)

In order for pilots flying trajectories to obtain the weightless state for the maximum duration at zero-g, instrumentation employing two accelerometers was designed for direct observation by the pilot. Microammeters receive the electric output of the accelerometers and act as null indicators. Diagrams of instrumentation and the method of calibration of the instrument are given. Incidental mechanical problems in the use of the F-94 jet aircraft during these flights are mentioned.

7240

Slater, A. E.

THE PROBLEM OF WEIGHTLESSNESS.—Space-flight (London), 1 (3): 109-113. April 1957.

DLC (TL787.B725, v. 1)

Weightlessness is discussed as it relates to: (1) vision; (2) bodily sensations, including pressure on the skin where it takes the weight, tension of the muscles used in balancing, and pressure of internal tissues on each other due to weight; and (3) the balancing organs of the inner ear. Various experiments testing both animals and humans are described using both the upward and downward arcs flying the full parabola to produce the weightless state. Some of the periods of weightlessness have lasted up to 30 seconds. Subjective reports of sensations during weightlessness are given from one group of experiments. Eight subjects liked the sensation, three were indifferent to it, and five found it unpleasant and suffered from motion sickness. The answer to the problem of weightlessness, so far, is that it depends on who is being made weightless. But what will happen for longer—much longer—periods than 30 seconds remains a problem still.

7241

Slater, A. E.

SENSORY PERCEPTIONS OF THE WEIGHTLESS CONDITION.—In: Realities of space travel, p. 266-274. Ed. by L. J. Carter. London: Putnam, 1957.

DLC (TL790.A1B718)

Same as item no. 4964, vol. IV.

7242

Walton, H.

A DEVICE FOR ARTIFICIAL PRODUCTION OF ALTERNATING GRAVITATIONAL FORCES.—Jour. Aviation Med., 28 (2): 291-294. June 1957.

DLC (RC1050.A36, v. 28)

A device for simulating weightlessness is discussed. This device, named "gravitron", might take on two forms: (a) a straight vertical evacuated tube in which a pressurized chamber would freely fall; or (b) a "U"-shaped evacuated vertical tube system in which a pressurized tube would fall freely and oscillate from one "arm" to the other. A vertical tube 1,148 feet in height would allow a gravity-free state of 41 seconds duration and a deceleration-acceleration at 4 g for 4.6 seconds. Such a device might be used as a physiologic or psychologic test instrument with living subjects or as a physical testing device to study equipment designed to function in the gravity-free state.

7243

Ward, J. E.

REQUIREMENTS FOR PRESENT-DAY EXPERIMENTAL ZERO GRAVITY PARABOLAS.—School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 57-121, July 1957. 6 p. AD 143 896

UNCLASSIFIED

A simplified presentation is described of the principles involved in the experimental production of zero gravity trajectories for the less mathematically inclined pilots and flight surgeons. Graphs are presented which indicate what must be the aircraft entry velocity, angle of climb at entry, and maximum altitude attained during a maneuver to produce a specific number of seconds of zero gravity.

d. Barometric Pressure (Altitude)

[Altitude suits under 10-b; Altitude sickness under 8-b]

7244

Becker, E. L.,

J. A. Schilling, and R. B. Harvey

RENAL FUNCTION IN MAN ACCLIMATIZED TO HIGH ALTITUDE.—Jour. Applied Physiol., 10 (1): 79-80. Jan. 1957.

DLC (QP1.J72, v. 10)

Studies were made in the Andes at an altitude of 15,000 feet on male natives who had lived continuously at high altitude. The results show an 11% decrease in renal filtration rate, a 52% decrease in effective renal plasma flow, an 89% increase in filtration fraction and a 44% increase in hematocrit values as compared with individuals living near sea level. The acclimatized individuals represent a climatophysiological variety of the human race different from sea level dwellers.

7245

Beller, N. N.

[THE ROLE OF INTEROCEPTORS IN THE CONTROL OF OXYGEN SATURATION OF ARTERIAL BLOOD.

I. ROLE OF THE CAROTID SINUS IN THE REGULATION OF THE OXYGEN SATURATION OF ARTERIAL BLOOD IN HYPOXIA] Znachenie interotseptorov v regulatsii nasyshcheniia arterial'noi krovi kislorodom. I. Rol' sinokarotidnykh zon v regulatsii nasyshcheniia arterial'noi krovi kislorodom v usloviakh gipoksii.—Biulleten' eksperimental'noi biologii i meditsiny (Moskva), 43 (6): 12-18. June 1957. In Russian, with English summary (p. 17-18).

DLC (R850.B55, v. 43)

Studies were made of the oxygen saturation in arterial blood in animals during exposure to a simulated altitude of 7,500 m. Photoelectric oxyhemometry was used for this study in rabbits and cats with denervation of the carotid sinus zones, as well as in controls. In the controls the saturation diminished to 55-62% and increased somewhat after 8-10 minutes' exposure to altitude. In the experimental animals the diminution of oxygen saturation was more pronounced, reaching 40-50% and remaining within this range during the whole period of exposure. The experiment demonstrated that the dynamics and the degree of oxygen saturation of arterial blood in hypoxia depend on the function of the carotid sinus zones. (Author's abstract, modified)

7246

Berendsohn, S.,
and M. Muro

[HEMATOLOGICAL CONSTANTS IN WOMEN RESIDENTS OF HIGH ALTITUDES] Constantes hematológicas en mujeres residentes de las grandes alturas.—Anales de la Facultad de medicina, Universidad nacional mayor de San Marcos de Lima (Peru), 40 (4): 925-935. 1957. In Spanish. DNLM

Hematological studies of women between 16 and 58 years of age living at high altitude (Morococha, Peru, 4,540 meters above sea level) showed polycythemia, which acts as a compensatory mechanism for the anoxemia caused by low oxygen pressure at altitude. This phenomenon also occurs in men living at altitude. Granulocytes and platelets showed no significant modification, indicating that the anoxic stimulus acts only on elements of the erythroid series. (21 references)

7247

Berry, L. J.

CITRIC ACID CONTENT OF MOUSE TISSUES FOLLOWING ALTITUDE STRESS.—Bryn Mawr Coll., Pa.; issued by School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 57-152, Sept. 1957. 4 p. AD 149 192 UNCLASSIFIED

Mice exposed to a simulated altitude of 20,000 feet for 3 to 4 months show approximately the same percentage decrease in tissue citric acid as that previously reported for periods of 3 to 6 weeks. Altitude mice also show the same greater susceptibility to *Salmonella typhimurium* infection compared to control mice as those acclimatized for 3 to 6 weeks. The change in tissue citric acid associated with mice adapting to altitude could not be duplicated in animals given a daily injection of 1 mg. cortisone acetate for 2 weeks prior to the assays. Nor was there a correlation between a lowered blood sugar induced by 17 hours of inanition and reduced tissue citrate. This treatment, in contrast, was accompanied by an elevated citric acid in all tissues. (Author's abstract)

7248

Berry, L. J.,

C. Beuzeville Ferro, and C. Krumdieck Boit
METABOLIC STUDIES OF GUINEA PIGS NATIVE TO THE HIGH ANDES AND TO THE PERUVIAN COASTAL PLAIN.—School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 57-134, Sept. 1957. 15 p. AD 149 705 UNCLASSIFIED

Tissues of guinea pigs native to altitudes of 14,000 feet, or above, in the central Peruvian Andes and to the coastal plains of Peru were analyzed, with and without arsenite injections, for citric acid, pyruvic acid, and alpha-ketoglutaric acid. Similar analyses were made on tissues of animals derived from each environment following periods of residence at the other. While differences were obtained, there was no uniform change, due, at least in part, to the large range of values found within groups. This variation in individual values may be attributed to the heterogeneity of the animals employed. It became evident, not only from tissue assays but also from mortality data, that the "downhill" stress may be as significant to a well-acclimatized altitude animal as the reverse change is for a "sea-level" animal. Manometric measurements on liver and kidney slices yielded lower Q_{O_2} values for kidney from altitude guinea pigs compared to sea-level guinea pigs. No differences were observed with liver slices derived from comparable animals. Sea-level animals at altitude for six weeks were more resistant to *Salmonella typhimurium* infection than altitude animals similarly infected. (Authors' abstract)

7249

Biber, T.

[ON THE DEMONSTRATION OF HEMOPOIETIN IN

HUMAN BLOOD DURING STAY AT HIGH ALTITUDE] Über den Nachweis von Hämopoietin im menschlichen Blut bei Höhengaufenthalt.—*Helvetica physiologica et pharmacologica acta* (Basel), 15 (4): 408-418. 1957. In German, with English summary (p. 416). DNLM

Erythropoiesis in rats is stimulated by injection of human plasma drawn from subjects staying at high altitude (3500 m.). The greatest hemopoietic activity of the human plasma was found at a time when the number of blood reticulocytes was at a maximum. The plasma of subjects who showed no rise in the number of erythrocytes and reticulocytes proved to be inactive in the animal experiment. After a relatively short stay in the low pressure chamber (up to 8 hours) the human plasma was shown to be inactive in the animal experiment. The hemopoietic activity of the altitude plasma was diminished after treatment with pure oxygen (30 minutes). Hemopoietin on the other hand could be demonstrated to be present in boiled and almost protein-free extract. (Author's summary)

7250

Bramati, C.

[CONTRIBUTION TO THE STUDY OF THE SPLEEN IN ANOXIA. I.] Contributo allo studio della milza in anossia. I.—*Rivista di medicina aeronautica* (Roma), 20 (2): 199-209. April-June 1957. In Italian with English summary (p. 207-208).

DLC (RC1050.R56, v. 20)

Splenic contraction in rabbits exposed to barometric decompression was studied by means of radiography and cinematography. It was observed that contraction appeared at about 3,000 meters, and reached its peak value at approximately 5,200 meters. Further increase in altitude did not produce additional contraction. Blood collected at altitude showed polycythemia and an increase in hemoglobin and hematocrit values.

7251

Bramati, C.,

and G. Meineri

[RADIOLOGICAL INVESTIGATION ON THE MECHANICAL EFFECTS OF EXPLOSIVE DECOMPRESSION ON THE DIGESTIVE APPARATUS OF THE GUINEA PIG] Indagine radiologica sugli effetti meccanici della decompressione esplosiva sull'apparato digerente della cavia.—*Rivista di medicina aeronautica* (Roma), 20 (3): 477-493. July-Sept. 1957. In Italian, with English summary (p. 492).

DLC (RC1050.R56, v. 20)

Thirty guinea pigs were explosively decompressed from a simulated altitude of 405 mm. Hg to 90 mm. Hg. Using a special technique of high-speed cinematography, it was observed that at a pressure gradient of 315 mm. Hg and at a decompression time of 0.025 seconds, maximum abdominal expansion occurred after 1.5 seconds. It was also revealed that visceral distention is in direct relation to the quantity of gas present in the digestive apparatus; that the mechanical action of the explosive wave caused a slight displacement of the viscera in the direction of the decompression orifice; and that, after recompression, a slight distention of the hollow organs remains.

7252

Bolt, W.,

H. Valentin, and N. Tietz

[PRESSURES IN THE PULMONARY ARTERY, STROKE MINUTE VOLUME, AND RESPIRATION

DURING ACUTE RESPIRATORY HYPOXIA CORRESPONDING TO ALTITUDES OF 4000 AND 5000 METERS IN OLDER INDIVIDUALS] Drucke in der Pulmonalarterie, Herzminutenvolumen und Atmung bei akuter respiratorischer Hypoxie entsprechend Höhen bis 4000 und 5000 Meter bei älteren Personen.—Archiv für Kreislaufforschung (Stuttgart), 27 (1): 19-33. Sept. 1957. In German. DNLN

A hypoxic tolerance test was administered to 9 subjects between the ages 56 and 82 years by means of a rebreathing experiment on the spiograph. Composition of gases in the venous mixed blood and the arterial blood, as well as the pressures present at the same time in the arterial part of the pulmonary and systemic circulation were determined by means of catheterization of the right side of the heart and arterial puncture. The values were registered after every 1000 meters of simulated ascent up to 4000 meters (in some cases even up to 5500 or 7000 m.). There were no significant changes in oxygen uptake, respiration, or pulse rate up to 4000 m. The oxygen content in the venous mixed blood fell an average of 10%, in the arterial blood 23%. This was reflected in a markedly lowered arterial-venous difference and an increase in the stroke minute volume of 73% at a continuous oxygen uptake. In the aged subjects there was a moderate decrease in pulmonary artery pressure. The difference in the behavior of pulmonary arterial pressure in younger and older individuals is discussed in detail.

7253

Candole, C. A. de
[BAROMETRIC PRESSURE AND CIRCULATION]
Pression barométrique et circulation.—Force aérienne, Service de santé, Bulletin technique d'information [Bruxelles], 1957 (Dec.): 12. In French.

DNLN

Cerebral ischemia which causes unconsciousness of the pilot during flight is considered as one of the main causes of aircraft accidents. The frequency of accidents may be decreased by determining the level of actual stress permissible during flight and reducing it, especially when it is due to low barometric pressure, variation of temperature, restriction of body movements and solitude. Interpretation of experimental results concerning the nature of the circulatory response to stress caused by exposure to low barometric pressures shows that although the conditions are regulated at will, individual variations are too great for generalization, and the causative mechanisms badly adapted to the type of stress examined.

7254

Chiodi, H.
RESPIRATORY ADAPTATIONS TO CHRONIC HIGH ALTITUDE HYPOXIA.—Jour. Applied Physiol., 10 (1): 81-87. Jan. 1957. DLC (QP1.J72, v. 10)

Adult males who had either lived for long continuous periods at high altitudes or those who had been lowlanders and newly arrived at high altitude were studied at altitudes of 3990 and 4515 meters. At both altitudes resting pulmonary ventilation was significantly lower in the long-term residents than in the newcomers, but not as low as in the average sea dweller. Changes in $p\text{CO}_2$, alveolar ventilation and oxygen ventilatory equivalent were in accordance with those in total ventilation; therefore hyperventilation was greater in the newcomers. Oxygen breathing depressed the average ventilation in the newcomers, and respiratory response to inhaled CO_2 was also

greater. Response to inhaled CO_2 in long-term residents was equal to or less than in sea level subjects. Hemoglobin-oxygen affinity and arterial pH of the long-term residents were found to be within the normal sea level ranges. It appears that it is necessary for subjects to acclimatize to altitude for longer periods than previously thought. (Author's abstract, modified) (31 references)

7255

Chkhaidze, L. V.
[CHANGES IN THE COORDINATION STRUCTURE OF THE HUMAN GAIT IN HIGH MOUNTAIN CONDITIONS] Izmeneniia koordinatsionnoi struktury khod'by cheloveka v vysokogornykh usloviakh.—Biofizika (Moskva), 2 (5): 642-648. 1957. In Russian, with English summary (p. 648).

DLC (QH505.A1B53, v. 2)

At 3500 m. altitude above sea level the gait shows a disturbance in the coordination of component movements. Fatigue intensifies these disturbances. Automatism of the normal walk either in steep ascents or descents is distinctly affected. Certain of the components are dropped while new ones appear in addition to the ones retained.

7256

Cohen, M. S.,
C. M. Cox, and A. R. Stanley
EFFECT OF ALTITUDE ON SUSCEPTIBILITY TO GB.—Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. (Project no. 1081-71815). WADC Technical Report no. 57-450, July 1957. iv+15 p. AD 130 932

UNCLASSIFIED

No significant difference was found in the LD50 for rats subjected to intramuscular injection of GB (isopropyl methyl-phosphonofluoridate) at altitude or at ground level. When the rats were continuously exposed to various vapor concentrations of GB in a dynamic gassing chamber at ground level or at 30,000 feet, there was a significant difference in the mean expiration period. However, the data were so variable that the best Least Square line shows very poor significance. Beagle dogs similarly exposed to a continuous vapor concentration of GB showed no significant difference in time to death between ground level experiments and those conducted at 30,000 feet. (From the author's abstract)

7257

Cordier, D.,
and G. Pérès
[PROTEINEMIC DISORDERS INDUCED BY REPEATED STAY AT SIMULATED ALTITUDE]
Troubles de la protéinémie provoqués par des séjours répétés en altitude fictive.—Comptes rendus de la Société de biologie (Paris), 151 (1): 119-120. July 6, 1957. In French. DLC (QP1.S7, v. 151)

Rats exposed repeatedly to simulated high altitudes showed a decrease in total blood proteins, especially at 10,000 meters of altitude. The serum albumin fraction decreased notably, whereas the globulin fraction increased. The albuminous quotient fell below unity. Rats kept at an altitude of 1,800 meters for several weeks exhibited the same type of blood protein disorder.

7258

Dejmal, V.
[NEW DISCOVERIES AND PROBLEMS IN THE REALM OF HIGH-MOUNTAIN PHYSIOLOGY] Nové

poanaty a problémy vysokohorské fyziologie.—
Teorie a praxe tělesné výchovy a sportu (Praha), 5
(10): 596-603. 1957. In Czech, with English sum-
mary (p. 603). DLC (GV201.T38, v. 5)

A discussion is presented on the effect of elevated altitudes on the human organism. In comparison with air force physiology, high mountain physiology and physiological observations carried out during a mountain expedition are rather poor since the primary objective is sports achievement. Only in recent times the physician and the physiologist have become an integral part of an expedition. Acclimatization and individual altitude tolerance have a greater importance for mountaineering than the age factor. The best years are considered to be in the early thirties. A simple and reliable criterion is needed to differentiate between the failure of the neurocirculatory mechanism, metabolic failure, and the exhaustion of caloric reserve. Medical treatment after early discovery of a pathological state constitutes a further problem.

7259

Dejours, P.,

F. Girard, Y. Labrousse, R. Molimard, and A. Teillac

[EXISTENCE IN MAN OF AN OXYGEN STIMULUS OF VENTILATION AFTER ACCLIMATIZATION TO AN ALTITUDE OF 3613 METERS] Existence d'un stimulus oxygène de la ventilation après acclimatization à l'altitude de 3613 m, chez l'homme. — Comptes rendus de l'Académie des sciences (Paris), 245 (26): 2534-2536. Dec. 23, 1957. In French. DLC (Q46.A13, v. 245)

A simple oxygen test (inhalation of pure oxygen) was administered to three subjects acclimatized to an altitude of 3613 meters for 6-19 days. Oxygen breathing acted as a stimulus reducing pulmonary ventilation by 39% for a short period. This stimulus controlled half the ventilatory output and showed no tendency to decrease in intensity during acclimatization. It did not eliminate the carbon dioxide-pH stimulus which also controlled part of the ventilatory output at altitude after acclimatization.

7260

EXPLOSIVE DECOMPRESSION INCIDENT.—U. S. Navy Med. News Letter, 30 (12): 34-35. Dec. 20, 1957.

DNLM (W2.A5.B9Me)

While flying an XF8U-1, a pilot with no pressure-suit protection inadvertently jettisoned the canopy at an altitude of 48,500 feet and at 0.90 Mach. The events inducing the canopy loss were a function of the experimental flight and specialized configuration of the test aircraft. No physiological effects due to decompression or buffet were noted in the pilot after landing. However, approximately one hour later the pilot's throat was noticed to be sore and three hours later a full feeling existed in the sinuses. Medical examination four hours after decompression revealed a mild throat irritation and very small inflammation of one ear drum. Later effects included a sore nose, mild nasal passage irritation, slight bloodshot eyes, and sore neck muscles, stomach, and abdomen. Although the pilot was not grounded for physiological reasons, he was convinced that 50,000 feet is the maximum altitude where explosive decompression can be tolerated without partial- or full-pressure suit protection.

7261

Ferguson, F. P.,

Dietrich C. Smith, and J. Q. Barry
HYPOKALEMIA IN ADRENALECTOMIZED DOGS DURING ACUTE DECOMPRESSION STRESS. — Endocrinol., 60 (6): 761-767. June 1957.

DLC (QP187.A25, v. 60)

Unanesthetized, bilaterally adrenalectomized dogs maintained on cortisone, desoxycorticosterone acetate, or in a state of moderate adrenal insufficiency were exposed to a simulated altitude of 30,000 feet. Plasma K concentration had decreased by the end of the first 30 min. and remained so until the end of decompression. This agrees with similar observations made on intact dogs under the same conditions. Plasma Na remained unchanged during the exposure as it was in intact dogs. It is concluded that in these dogs the adrenal glands do not mediate the hypokalemic response to high altitude.

7262

Fiorelli, W.

[X-RAY INVESTIGATION OF THE BEHAVIOR OF GASTRIC TONUS DURING ADAPTATION TO ALTITUDE] Röntgenologische Untersuchungen zum Verhalten des Magentonus während der Höhenanpassung. — Medizinische Klinik (München), 52 (43): 1879-1881. Oct. 25, 1957. In German.

Investigations of gastric peristalsis were undertaken in 51 subjects during a one- to two-week skiing course at Obergurgl (2000 m. altitude). Orthodiagraphic observations of the gastric shape and peristalsis movements were carried out in the morning and at noon before eating. In most subjects there was a decrease of the gastric tonus and lengthening of time intervals between the peristaltic waves by approximately 6 seconds. Of the 14 cases without changes in the gastric tonus, eight had primary hypotonicity.

7263

Ganoza, Z.

[SOME ANTHROPOMETRIC ASPECTS OF THE ANDEAN MAN] Algunos aspectos antropométricos del hombre andino. — Revista de la Asociación médica de la provincia de Yauli (La Oroya), 2 (2-3): 240-241. April-Sept. 1957. In Spanish. DNLM

Growth of Andean natives is usually completed by 19 years of age. Their low body weight is related to a diet based on flour, climate, and altitude, and their small stature due to racial and altitude factors. Since pulmonary capacity is decreased at altitude, pulmonary congestion is evident.

7264

Girling, F.,

and F. A. Sunahara

AN EFFECT OF REDUCED BAROMETRIC PRESSURE ON THE PERIPHERAL CIRCULATION. — Canad. Jour. Biochem. and Physiol. (Ottawa), 35 (10): 777-783. Oct. 1957. DLC (R11.C37, v. 35)

Several groups of investigators have noted in the past that exposure to a reduced barometric pressure results in a decrease in peripheral blood flow. In the present study human subjects were exposed to a pressure of 225 mm. Hg with maintenance of arterial oxygen saturation, and forearm and hand blood flows were measured plethysmographically. Forearm blood flow was not affected by the exposure whereas hand blood flow was reduced in all subjects. Blood pressure and heart

rate were also measured and showed no change during the experiment. (Authors' abstract)

7265

Gold, A.,

F. P. Ferguson, and J. Q. Barry

HYPOKALEMIA AND RESPIRATORY ALKALOSIS IN ANESTHETIZED DOGS DURING ACUTE DECOMPRESSION STRESS [Abstract].—*Physiologist*, 1 (1): 33. Nov. 1957. DNLM

In dogs breathing room air in a decompression chamber, the mean plasma potassium concentration fell from a predecompression level of 3.91 mEq/liter to 3.44 mEq/liter after 30 minutes at 30,000 ft. A marked rise in blood pH and fall in arterial carbon dioxide tension occurred, indicating a respiratory alkalosis. In a second group, the dogs breathed a gas mixture containing 20% carbon dioxide, 21% oxygen, and 59% nitrogen during the decompression phase. The concentration of carbon dioxide was equivalent to 45 mm. Hg pressure at 30,000 ft. Under these conditions, respiratory alkalosis was prevented and the characteristic hypokalemic response failed to occur. Respiratory alkalosis constitutes an important factor in the production of hypokalemia during acute decompression stress. The precise mechanism by which alkalosis and hypokalemia are related remains somewhat obscure. (Authors' abstract, modified)

7266

Grandpierre, R.,

F. Violetta, and R. S  nelar

[STUDY OF THE COEFFICIENT OF LEAKAGE AND OF THE RATIO OF CRITICAL PRESSURE IN EXPLOSIVE DECOMPRESSION] Etude du coefficient de fuite et du rapport de pression critique dans les d  compressions explosives.—*Journal de physiologie* (Paris), 49 (1): 180-182. Jan-March 1957. DNLM

Guinea pigs were subjected to decompression at pressure ratios (initial pressure/final pressure) of 1.4, 1.7, 2.3, 3.1, and 4.6 and at a coefficient of leakage (surface area of the orifice of escape/volume of the container) of $1\text{m}^2/3.2\text{m}^3$. Studies were made immediately after, 24 hours after, and 48 hours after exposure. Hemorrhagic lesions appeared in the lung at a pressure ratio of 1.7. At a ratio of 3.1 the lesions healed with difficulty. It appears that a ratio of 2.3 can be used as a limit below which damage will be reversible. It is concluded that decompression can be rendered relatively harmless by controlling the coefficient of leakage and the pressure ratio.

7267

Greider, H. R.,

and L. J. SantaMaria

SOME PHYSICAL FACTORS AFFECTING GASEOUS CAVITY FORMATION IN DECOMPRESSED ANIMALS.—Naval Air Material Center. Air Crew Equipment Lab., Philadelphia, Pa. (Project NM 12 01 13 3). Report no. NAMC-ACEL-355, Nov. 15, 1957. v+6 p. + 3 photographs. AD 199 337

UNCLASSIFIED

Explosive decompression (7 milliseconds) of rats results in cavities of greater proportions than those following rapid (15 seconds) decompression in ascents from sea-level to 80,000 feet. In explosions from sea-level to 50,000 feet, only explosive decompression rates were instrumental in effecting cavities in the thorax and abdomen. When animals were rapidly decompressed from sea level to 80,000 feet, exposed at this altitude for 60 seconds, and then

rapidly recompressed, small cavities still persisted in the thorax. The rate of decompression is a major contributing factor in cavity formation. (From the authors' abstract)

7268

Grognot, P.,

and R. S  nelar

[PULMONARY LESIONS IN ANIMALS AFTER EXPERIMENTAL EXPLOSIVE DECOMPRESSION] Les l  sions pulmonaires de l'animal apr  s d  compressions explosives exp  rimentales.—*Journal de physiologie* (Paris), 49 (1): 182-183. Jan.-March 1957. DNLM

Decompression of 186 animals was carried out in less than 0.03 second. A brief description is given of the macroscopic effects on the lungs. Areas of hemorrhage and emphysema are described, and microscopic effects on the bronchioles, the pleura, and the pulmonary parenchyma are given. Areas of atelectasis are described and are thought to be compensatory to emphysema. The congestive lesions and hemorrhages disappeared at the end of 48 hours.

7269

Grognot, P.,

and R. S  nelar

[SOME CONSIDERATIONS ON THE ANATOMOPATHOLOGICAL LESIONS PRODUCED BY EXPLOSIVE DECOMPRESSION AT THE LEVEL OF THE LUNG IN THE GUINEA PIG] De quelques consid  rations sur les l  sions anatomopathologiques produites par des d  compressions explosives au niveau du poumon de cobaye.—In: The first European congress of aviation medicine, p. 129-146. *Aeromedica acta* (Soesterberg, Netherlands), Special edition, 1957. In French, with English summary (p. 146). DNLM Also published in: *M  decine a  ronautique* (Paris), 12 (1): 23-39. 1957. In French, with English summary (p. 39). DLC (TL555.M394, v. 12)

Guinea pigs were subjected to explosive decompression in a chamber with pressure quotients ranging from 1.3 to 4.6, in order to determine the threshold pressure quotient at which histological pulmonary lesions develop. The quotient of 3.1 was found to produce pulmonary hemorrhage, emphysema, and atelectasis. Below this level the lesions were reversible and caused few functional disturbances. Above 3.1 they were reversible to a lesser degree and sometimes proved fatal. Continuous inhalation of 100% oxygen for 4 hours at ground pressure aggravated the lesions and retarded the regression process. Protection against the noxious effects of oxygenation was obtained by the administration of 3554-RP (an antihistaminic) and chlorpromazine. 3554-RP exhibited a protective effect against decompression of medium intensity. For higher pressure values during explosive decompression only mechanical devices appear useful. Included are figures of the pulmonary histology.

7270

Hall, A. L.

THE RATE AND MAGNITUDE OF EXPLOSIVE DECOMPRESSION REQUIRED TO PRODUCE LETHAL EFFECTS IN ALBINO RATS.—Naval School of Aviation Medicine, Pensacola, Fla. (Research Report no. NM 12 01 11, Subtask 5). Report no. 3, Jan. 31, 1957. iii+7 p. UNCLASSIFIED

Control groups of rats were decompressed from sea level to 40,000 feet, 69,000 feet, and 105,000 feet

in 0.53, 0.9, and 1.11 seconds respectively. Experimental groups of rats were explosively decompressed over the same ranges as the control groups at rates of 0.0043, 0.0068, and 0.0075 second respectively. No control rats were killed, but 40%, 70%, and 70% respectively of the experimental rats died as a result of the explosive decompression. (Author's abstract)

7271

Hamburger, R. J.

[HEMOGLOBIN ELECTROPHORESIS IN HYPOXIA]

Haemoglobine electrophorese bij hypoxie.—*Aeromedica acta* (Soesterberg, Netherlands), 5: 399-402. "1956/57". In Dutch, with English summary (p. 402).

It has been demonstrated recently that variations in the synthesis of hemoglobin result in different forms of the hemoglobin. Although this far the established variations were hereditary, the possibility exists that other factors, such as prolonged hypoxia, may also interfere with the normal hemoglobin synthesis. Deviations of the hemoglobin molecule were investigated in rabbits kept for 2-3 weeks at 7000 m. simulated altitude, 7 hours a day. Hemoglobin displacement was measured with paper electrophoresis by scanning the paper with a photoelectric cell and reflected light. No changes in hemoglobin mobility as a result of hypoxia could be demonstrated.

7272

Harboe, M.

LACTIC ACID CONTENT IN HUMAN VENOUS BLOOD DURING HYPOXIA AT HIGH ALTITUDE.—*Acta physiologica scandinavica* (Stockholm), 40 (2-3): 248-253. 1957. DNLN

The concentration of lactic acid in human venous blood has been determined during hypoxia—the subjects breathing atmospheric air at high altitudes. Lactic acid concentration increases, depending on the degree and duration of hypoxia. Apart from heights of 15,000 to approximately 20,000 ft., where the lactic acid concentration increases simultaneously with increasing disability, such concentration is poorly correlated to the functional disability during hypoxia. (Author's summary)

7273

Iriarte, D. R.

[FLYING AND BLOOD CHOLESTEROL] La aviación y el colesterol sanguíneo.—*Ciencia aeronáutica* (Caracas), 4 (34): 20. Sept. 1957. In Spanish.

DLC-Per

A normal blood cholesterol level was found in 22 pilots with 1,000 hours of flying time, in others cholesterolemia varied between 2.45 and 3.20 grams per liter. Of 65 pilots with 1,000-5,000 hours of flying time, only 13 showed normal blood cholesterol levels; 80% had cholesterolemia varying between 227 and 370 milligrams per 100 cc. Twenty-four pilots with 5,000 and 10,000 hours flying time had normal cholesterol levels, but 87% had hypercholesterolemia varying between 221 and 286 milligrams per 100 cc., with an average of 2.55 grams per liter. Of 62 pilots with over 10,000 hours flying time, 21 showed normal cholesterol levels, and 41 (66%) cholesterolemia varying between 222 and 468 milligrams per 100 cc. with an average of 2.76 grams per liter. It is concluded that hypercholesterolemia in pilots is caused by repeated exposure to altitude (anoxia).

7274

Jalavisto, E.,

and J. Sundberg

THE EFFECT OF EXPOSURE TO LOW PRESSURE, OF RESTRAINING AND OF INJECTIONS OF ADRENALINE ON THE RATE OF REDUCTION OF METHAEMOGLOBIN IN RABBIT ERYTHROCYTES.—*Annales medicinae experimentalis et biologiae Fenniae* (Helsinki), 35 (3): 250-257. 1957. In English. DNLN

The rates of methemoglobin reduction (MRR) in nitrite-treated washed red cells of rabbits were studied in various physiological conditions. After exposure to low atmospheric pressure (360 mm. Hg, 6 hours a day, during 6-8 days) the MRR was found to be increased from a mean rate of 54% to 64% per hour. Restraining of the animals led to a similar increase in the MRR. Possible mechanisms for the increased rates of methaemoglobin reduction are discussed. (From the author's summary).

7275

Karstens, A. I.

TRAUMA OF RAPID DECOMPRESSION. — *Amer. Jour. Surg.*, 93 (4): 741-746. April 1957. DLC (RD1.A37, v. 93)

The hazards of rapid decompression in flight lie chiefly in ensuing hypoxia, accidental ejection, and associated physical injuries. Proper equipment and operating procedures can circumvent all these hazards. During chamber indoctrination runs, rapid decompression can produce pulmonary injury if persons anticipating the decompression intentionally close the glottis or Valsalva, at the wrong moment. The mechanism of injury and the sequelae are identical with those of injury while surfacing from depth under water, where opportunity to inspire at depth existed, and the glottis was closed during the ascent. Experience to date would indicate that unintentional closure of the glottis at the time of an unpredictable accidental decompression in an aircraft is extremely unlikely, and the hazard of pulmonary injury exceedingly remote. The problem of exceedingly rapid decompressions, of the order of 1 to 5 milliseconds, is briefly discussed. (Author's summary)

7276

Kellogg, R. H.,

1957

B. E. Vaughan, and D. W. Badger

RESPIRATORY RESPONSES TO ACUTE CHANGES IN O₂ AND CO₂ DURING ACCLIMATIZATION TO HIGH ALTITUDE [Abstract]. — *Federation Proceedings*, 16 (1, part I): 70-71. March 1957.

DLC (QH301.F37, v. 16)

Four adult male sea-level residents were studied at Berkeley (250 ft. above sea level) and then flown to the White Mountain Research Station for additional study during two or more weeks' residence at the Summit Laboratory (14,250 ft.). The alveolar carbon dioxide required to produce any given level of respiratory stimulation decreased about 13 mm. Hg during the first few days of acclimatization and, regardless of this large readjustment, was always about 1-3 mm. Hg lower when alveolar oxygen tension was fixed during the test below the hypoxic threshold (55 mm. Hg) than when it was fixed above the hypoxic threshold (100 or 225 mm. Hg). These results indicate that chemoreceptor responsiveness to hypoxia remains essentially constant during respiratory acclimatization to this altitude, and not merely initiates

the respiratory adjustments but also continues to contribute a small but significant stimulus to respiration throughout the large readjustments in carbon dioxide response. (Authors' abstract, modified)

7277

Kellogg, R. H.,

N. Pace, E. R. Archibald, and B. E. Vaughan
RESPIRATORY RESPONSE TO INSPIRED CO₂
DURING ACCLIMATIZATION TO AN ALTITUDE
OF 12,470 FEET. — *Jour. Applied Physiol.*, 11
(1): 65-71, July 1957. DLC (QP1.J72, v. 11)

The respiratory stimulation produced by adding graded amounts of CO₂ to the inspired gas was studied in four adult male subjects at sea level and during acclimatization to an altitude of 12,470 feet. During acclimatization, the curve relating respiratory minute volume to inspired or alveolar CO₂ shifted to the left by 8 to 11 mm. Hg, while the shape and slope of the curve did not change significantly. This indicates primarily a change in the CO₂ levels to which the regulatory mechanisms respond, rather than a change in the magnitude of the response to a given level of CO₂. Most of the change occurred in the first 2 days at altitude. A possible mechanism depending primarily on the initial hypoxic stimulation of the chemoreceptors, which might explain the shift in CO₂ response, is discussed. (Authors' abstract) (20 references)

7278

Kolder, H.

[DEPENDENCE OF THE EFFECTS OF EXPLOSIVE
DECOMPRESSION ON THE ABSOLUTE PRESSURE]
Die Abhängigkeit der Wirkung einer explosiven
Dekompression vom absoluten Druck. — *Pflügers
Archiv für die gesamte Physiologie* (Berlin), 264 (5):
456-459, 1957. In German. DLC (QP1.A63, v. 264)

In explosive decompressions from superatmospheric to atmospheric pressure, and from atmospheric to subatmospheric pressure within 1 millisecond, a drop in pressure at a ratio of $P_A/P_E = 2-2.5$ results in a 50% lethality in rats and mice. For the same effect with decompression from subatmospheric pressure to lower pressure, the P_A/P_E ratio increases and the absolute difference in pressure becomes smaller. Mice are more susceptible to the effects of explosive decompression. A pressure difference of 0.25 kg./cm.² at decompression to 0.02 kg./cm.² represents the minimal pressure difference giving a 50% lethality rate in rats and mice. It is possible that the need to achieve a certain pressure differential at extremely short decompression times may be responsible for the fact that other researchers have not reported lethal effects due to the mechanical action of explosive decompression.

7279

Kolder, H.

EXPLOSIVE DECOMPRESSION. — In: The first
European congress of aviation medicine, p. 147-151.
Aeromedica acta (Soesterberg, Netherlands), Special
edition, 1957. In English. DNLM

Approximately 700 rats were decompressed and the results evaluated to clarify the extent to which lethality after explosive decompression is a function of the pressure difference and decompression time. The effects of explosive decompression (e.d.) are directly proportional to the pressure difference and inversely proportional to decompression time. Pre-

treatment (wrapping the thorax with sponge rubber, barbiturate anesthesia, vagotomy, and ether anesthesia) decreased the mortality. Immediately upon e.d. there is a respiratory standstill, bradycardia followed by cessation of heart action for several seconds, and a second phase of bradycardia with electrocardiographic signs of pathology. Postmortem findings and post-decompression symptoms are best explained by arterial air embolism. The fact that artificial pneumothorax offers almost complete protection against explosive decompression suggests that air embolism is not caused by liberation of gases in the blood vessels.

7280

Kolder, H.

[EXPLOSIVE COMPRESSION: SUDDEN INCREASE
OF AIR PRESSURE FROM SUBATMOSPHERIC TO
ATMOSPHERIC PRESSURE] Explosive Kompression:
Plötzliche Erhöhung des Luftdruckes von
Unterdruck auf Normaldruck. — *Pflügers Archiv für
die gesamte Physiologie* (Berlin), 264 (5): 441-455,
1957. In German. DLC (QP1.A63, v. 264)

Experiments are described in which after a slow decompression rats were recompressed to normal pressure over extremely short periods of time (0.98 atmospheres in 1 millisecond). Lethality was a function of the pressure difference and the recompression time. Compression of the thorax was observed within 5 msec.; it reached a maximum after 15-20 msec.; and had disappeared after 40 msec. Artificial pneumothorax offered limited protection. Electrocardiograms revealed instantaneous bradycardia followed in a few seconds by pathological changes similar to those described after air blast injury and explosive decompression. The main findings upon autopsy were pulmonary hemorrhages, arterial air embolism, and pulmonary edema. The similarity in findings suggests that increase and decrease of pressure may be equally effective in air blast injury.

7281

Kratochvil, C. H.

HYPOXIA AND HYPEROXIA. — *Amer. Jour. Surg.*,
93 (4): 719-723, April 1957.

DLC (RD1.A37, v. 93)

Hypoxia and hyperoxia are discussed as to their occurrence in the Air Force, their symptomatology, and measures taken to prevent their appearance. The term hypoxia is now generally used to describe the effects of lowered oxygen tensions in the inspired air. In general, the Physiological Training Program carried out by the Air Force is effective in preventing hypoxia accidents. However, the problem of keeping the crew on the alert for this danger still remains. Tables are presented showing the times of useful consciousness at various altitudes without oxygen breathing and equivalent altitudes breathing air and breathing 100% oxygen. Hyperoxia, or oxygen intoxication, on the other hand, can be said to represent no problem at present in the Air Force. The relationship between radiation damage and oxygen poisoning is indicated as well as the significance of this to nuclear-powered aircraft.

7282

Lalli, G.

[BEHAVIOR OF TOTAL LIPIDS AND SOME LIPID
FRACTIONS DURING ACCLIMATIZATION TO HIGH
ALTITUDE] Comportamento di lipidi totali e di
alcune frazioni lipidiche nel corso dell'acclimata-

sione alle alte quote.—Rivista di medicina aeronautica (Roma), 20 (1): 37-46. Jan.-March 1957. In Italian, with English summary (p. 41-42).

DLC (RC1050.R56, v. 20)

During acclimatization to a simulated altitude of 6,500 meters rabbits exhibited a phase characterized by lipemia. This phenomenon was caused by the increase of total, free, and combined beta-steroids, phosphatides, and to a lesser degree, other lipid fractions considered as a whole such as neutral fats, fatty acids, and steroids not precipitated by digitonin.

7283

Lalli, G.

[CHANGES OF THE BACTERIOLYTIC POWER OF RABBIT SERUM INDUCED BY PROLONGED ANOXIA] Modifiche indotte dall'anossia continua sul potere batteriolitico del siero di coniglio.—Rivista di medicina aeronautica (Roma), 20 (3): 406-412. July-Sept. 1957. In Italian, with English summary (p. 411).

DLC (RC1050.R56, v. 20)

The blood of rabbits kept at simulated altitudes of 5000-6000 meters for five days showed a remarkable increase in bacteriolytic power towards *Salmonella typhi*. The bacteriolytic behavior of the blood was determined by an exact turbidimetric method.

7284

Langen, C. D. de

HYPOXAEMIA AND MYOGLOBIN.—Aeromedica acta (Soesterberg, Netherlands), 5: 355-358. 1956/57. In English. DNLM

A study was made of the myoglobin content in muscles of the hind legs of rabbits before and after 4 days at 7000 m. simulated altitude. There was an increase of myoglobin and this increase was proportionally higher than the increase of the hemoglobin in the blood. It is suggested that this represents an important mechanism of adaptation to anoxemia.

7285

Macedo, D. J.

[ARTERIAL PRESSURE OF THE CHILD AT ALTITUDE] La tensión arterial en el niño de la altura.—Revista de la Asociación médica de la provincia de Yauli (La Oroya), 2 (2-3): 232-239. April-Sept. 1957. In Spanish. DNLM

Blood pressure studies of children living at altitude showed a tendency towards hypotension, especially systolic. Pressure values were found to increase with age. (38 references)

7286

Majumdar, K. K.

POSTDECOMPRESSION SHOCK: A CASE REPORT.—Aero Med. Soc. Jour. (New Delhi), 4 (1): 9-14. Dec. 1957. DNLM

A case is presented of serious postdecompression shock (neurocirculatory collapse at altitude) which occurred in an obese pilot after about one hour at a simulated altitude of 37,000 feet in a decompression chamber run, prior to proceeding for conversion to jet training. Pulmonary air embolism causing generalized vasodilation through the pulmonary relief reflex may have contributed to the collapse. A brief outline is included of suggested treatment for such cases.

7287

Meneses Hoyos, J.

[CARDIAC OUTPUT IN PERSONS ACCLIMATED TO

THE ALTITUDE OF MEXICO CITY (2,240 METERS ABOVE SEA LEVEL) IS NOT APPRECIABLY HIGHER THAN THAT OF INHABITANTS OF LOWER LEVELS] El trabajo del corazón en los aclimatados a la altitud de la Ciudad de México (2,240 metros sobre el nivel del mar), no es sensiblemente mayor que el de los habitantes de lugares bajos.—Medicina, Revista mexicana (Mexico), 37 (780): 429-444. Sept. 25, 1957. In Spanish, with English summary (p. 442). DNLM

Normal values for blood circulation were determined in inhabitants of Mexico City (7,345 feet above sea level). Results showed that the characteristics of blood circulation were the same as those found in persons living at sea level, with minor differences. Differences were found in blood characteristics (erythrocyte number, hematocrit, hemoglobin concentration, total volume of circulating blood). These differences, although slight, were enough to explain altitude acclimatization. Cardiac output did not appear to increase in inhabitants of Mexico City. (65 references)

7288

Michel, E. L.,

and H. R. Greider

DETERMINATION OF THE EFFECTIVE EXTERNAL DEAD AIR SPACE LIMITATIONS AT ALTITUDE.—Naval Air Material Center. Air Crew Equipment Lab., Philadelphia, Pa. (Project no. NM 12 01 13 5). Report no. NAMC-ACEL-365, Dec. 18, 1957. ii+7 p. + 4 photographs. AD 151 408 UNCLASSIFIED

Experiments are described which demonstrate the physiological limitations of individuals to added external dead air space. Tidal volumes appear to increase linearly with increasing amounts of added dead air space up to volumes of approximately 900 ml. Calculated work rate of breathing values for all data indicates that above 800 ml. added dead space individuals produce work rates of breathing associated with moderate to hard work. Statistical analysis of these data indicate that the effect of added dead space on the work rate of breathing is significantly different at altitude as compared to sea level and is significantly different between subjects. Multiple range tests applied to these data indicate that the first significant difference in work rate of breathing occurred at the 600-800 ml. range of added dead space, regardless of subject, either at sea level or 18,000 ft. (Authors' abstract)

7289

Missenard, A. R.

[PSYCHOLOGICAL MODIFICATIONS CAUSED BY HIGH-ALTITUDE FLIGHT] Les modifications psychologiques apportées par le vol à haute altitude.—Médecine aéronautique (Paris), 12 (3): 197-211. 1957. In French, with English summary (p. 211).

DLC (TL555.M394, v. 12)

Psychological reactions caused by high-altitude flight (above 15,000 meters) include sensory and cenesthetic modifications, mental tension, fatigue which may lead to acute incidents, anxiety, panic, etc. These reactions are determined by characteristics of the altitude and of the type of aircraft used, as well as by the means of protection (oxygen equipment, pressure suits, etc.) for altitude flight. If the protective means fail, progressively or suddenly, well-known disorders such as anoxia appear in a very short period of time. These disorders may be avoided by improving both the materials and the pilots (selection, indoctrination, medical care).

7290

Northup, D. W., 1957

J. C. Stickney, and E. J. Van Liere
EFFECT OF REDUCED PRESSURE ON THE
RAT'S HEART [Abstract]. — Federation Pro-
ceedings, 16 (1, part D): 95. March 1957.

DLC (QH301.F37, v. 16)

Three groups of at least 10 rats each were sub-
jected to a single explosive decompression to 33
mm. Hg and killed 2, 5, and 10 days later. The
average heart weight-body weight ratio was 3%
less than the controls in the 2-day group, 5%
greater in the 5-day group, and 1-1/2% greater in
the 10-day group. Since none of these changes was
statistically significant, no cardiac hypertrophy
was demonstrated. The temporary cardiac dilatation
produced by explosive decompression does not
cause either temporary or permanent hypertrophy.
(Authors' abstract, modified)

7291

Ohwaki, Y.

INFLUENCE OF LOW ATMOSPHERIC PRESSURE
ON THE DISCRIMINATIVE REACTION TIME.

— Tohoku psychologica folia (Sendai, Japan), 15
(3-4): 45-53, 1 unpag. leaf. 1957. In English.

DLC (BF1.A2, v. 15)

Five subjects performed on a discriminative re-
action-time task at normal barometric pressure
and while exposed to 3500 m. and 5000 m. simu-
lated altitude. Under normal pressure, the reaction
times were three times longer when the stimuli
were alternated irregularly than when they were
changed in a regular manner. At low atmospheric
pressure the discriminative reaction times were
lengthened considerably under both conditions. The
extent of deterioration varies individually to a
great extent.

7292

Peñaloza, D.,

and M. Echevarría

ELECTROCARDIOGRAPHIC OBSERVATIONS ON
TEN SUBJECTS AT SEA LEVEL AND DURING ONE
YEAR OF RESIDENCE AT HIGH ALTITUDES. —
Amer. Heart Jour., 54 (6): 811-822. Dec. 1957.

DLC (RC681.A1A58, v. 54)

Ten male subjects between the ages of 18 and 23
were taken from Lima, Peru, at sea level, to Moro-
cocha, at an altitude of 14,900 ft. Electrocardio-
graphic changes which occurred during one year of
residence in Morococha were studied. No variations
of the auricular activation process were observed.
Observations made in the ventricular activation
process indicate variations in cardiac position, and
an incipient development of right ventricular hyper-
trophy. Studies of the ventricular repolarization pro-
cess revealed early response to the anoxemia and
right ventricular overloading. Comparisons with the
electrocardiograms of some of the Morocochan
natives show that one year of residence at high alti-
tude was not sufficient for complete cardiac acclima-
tization. (Authors' summary, modified)

7293

Pillero, S. J.,

and B. Pansky

THE EFFECTS OF LOW PRESSURE AND INANITION
ON SERUM VITAMIN A LEVELS AND ELECTROPHO-
RETIC PATTERNS IN THE ADRENALECTOMIZED

RAT. — Arch. Biochem. and Biophysics, 66 (2): 454-
462. Feb. 1957.

DNLM

On the basis of an electrophoretic study of the
blood levels of vitamin A and β -carotene, no apparent
relation was found between vitamin A blood levels and
adrenal activity in untreated adult adrenalectomized
and sham-operated rats. In both groups of animals
subjected to the stress of starvation or lowered baro-
metric pressures, the increase in β -carotene levels,
when compared to untreated sham-operated controls,
accompanied by no change in vitamin A levels may
indicate an interference with the conversion of caro-
tene to vitamin A.

7294

Porton, W. M.

[THORACIC PRESSURE SYMPTOMS IN "EXPLOSIVE
DECOMPRESSION"] Thoracale drukverschijnselen
bij "explosive decompression". — Nederlands militair
geneeskundig tijdschrift ('s-Gravenhage), 10 (9):
264-274. Sept. 1957. In Dutch.

DLC (RC971.N4, v. 10)

The effects of explosive decompression on the
human organism are reviewed. Intrathoracic pres-
sures at different barometric pressures are mea-
sured and the symptoms compared. The appearance
of blast pressure waves is studied in particular,
noting the differential effects with and without an
oxygen mask. The author demonstrates the need for
a safety relief valve in oxygen masks and pressure
helmets.

7295

Pugh, L. G. C. E.

RESTING VENTILATION AND ALVEOLAR AIR ON
MOUNT EVEREST: WITH REMARKS ON THE RE-
LATION OF BAROMETRIC PRESSURE TO ALTI-
TUDE IN MOUNTAINS. — Jour. Physiol. (London),
135 (3): 590-610. March 1957.

DLC (QP1.J75, v. 135)

Observations of resting lung ventilation, alveolar
air, and the effect of oxygen at high altitudes were
made from sea level to 24,000 ft. on 12 subjects. At
18,000 ft. the resting ventilation rose over 100%
above that at sea level, but was variable among sub-
jects at different altitudes. The composition of al-
veolar air at 24,000 ft. averaged for CO₂ tension
16.8 mm. Hg and for O₂ tension 34.1 mm. Hg. After
administration of oxygen at 18,000 ft. there was an
immediate rise in CO₂ tension indicating that hypoxic
stimulation of breathing was still present. There
was a slow rise over many hours indicating a loss of
acclimatization. (24 references)

7296

Pulster, G. J.

IMPLOSIVE RECOMPRESSION. — Aeromedica acta
(Soesterberg, Netherlands), 5: 413-415. 1956/57.
In English.

DNLM

A hypothetical case is described of failure of the
pressurization mechanism during descent causing the
aircraft to arrive at sea level with a cabin altitude of
10,000 feet. In that case there ensues a reverse
situation from explosive decompression—implosive
recompression. Experiments with rabbits subjected
to implosion at 10,000 feet showed no ill effects due to
sudden recompression. However, there is a consider-
able danger of being hit by a loose object or of being
propelled by the inflowing air stream and thus inca-
pacitated.

7297

Reynafarje, C.
[THE Rh FACTOR AND OTHER BLOOD GROUPS IN PERUVIAN INDIANS] El factor Rh y otros grupos sanguíneos en los indios peruanos.—*Anales de la Facultad de medicina, Universidad nacional mayor de San Marcos de Lima (Peru)*, 40 (3): 573-584. 1957. In Spanish. DNLN

A study of Rh factors and other blood groups in 800 natives of the Peruvian Andes revealed (1) the presence of ABO, Rh-Hr, and MNS systems, (2) a high percentage of group O, (3) the near absence of Rho (D) negative subjects, (4) a high percentage of R_2 (CRE) type, and (5) a predominance of the M factor over the N factor. (20 references)

7298

Richmond, D. R.,
M. B. Wetherbe, R. V. Taborelli, T. L. Chiffelle,
and C. S. White
THE BIOLOGIC RESPONSE TO OVERPRESSURE. I. EFFECTS ON DOGS OF FIVE TO TEN SECOND DURATION OVERPRESSURES HAVING VARIOUS TIMES OF PRESSURE RISE.—*Jour. Aviation. Med.*, 28 (5): 447-460. Oct. 1957. DLC (RC1050.A36, v. 28)

An apparatus producing variable environmental pressure conditions is described. Dogs were exposed to overpressures of up to 170 p.s.i. for durations of 5-20 seconds, and baffles were used as protection against high velocity winds. Fatalities were limited to animals subjected to dynamic decelerative loading when no wind baffles were used. Gross pathology in nondisplaced but restrained animals, even though exposed to overpressures from 60 to 170 p.s.i. was limited to ear drum failure, sinus and middle ear hemorrhage, laryngeal petechiae and characteristic marginal, wedge-shaped hemorrhagic lesions of the costophrenic portions of the lung bases. (Authors' summary, modified)

7299

Rosenbaum, D. A.
EXPLOSIVE DECOMPRESSION STUDIES WITH ANIMALS WEARING FULL BLADDER SUIT AND HELMET.—Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio (Project no. 7160, Task no. 71814). WADC Technical Report no. 57-685, Nov. 1957. iv+15 p. AD 142 149 UNCLASSIFIED

Unanesthetized animals, wearing a full bladder suit and helmet suitably connected to an oxygen regulator, show no significant gross pathology following explosive decompression through 10 and 14 p.s.i. Mask and bladder pressures, measured in three animals, show both pressures to respond to the same peak pressure at the same rate. Two possible explanations for the essentially normal appearing lung fields, following decompression, are discussed. (Author's summary and conclusions)

7300

Rotta, A.,
and A. López
[THE ELECTROCARDIOGRAM AT HIGH ALTITUDES] El electrocardiograma en las grandes alturas.—*Revista peruana de cardiología (Lima)*, 6 (3): 167-181. Sept.-Dec. 1957. In Spanish, with English summary (p. 180). DNLN

Of 120 electrocardiograms of normal adults, native or long-term residents of Morococha, Peru (4540 meters above sea level), 23 (19.2%) presented definite

characteristic signs of right ventricular hypertrophy, 39 (32.5%) showed highly suggestive signs of right ventricular hypertrophy, 37 (30.8%) were classified as right bundle branch block, and 21 (17.5%) were found to be within normal limits. In most cases, a predominance of negative deflections of QRS complexes was observed in standard and precordial leads regardless of the dominant pattern. This finding gives the electrocardiogram at altitude a special characteristic not usually seen at sea level. It confirms the anatomic and radiographic finding of right ventricular hypertrophy previously obtained in individuals at altitude, which is thought to be related to pulmonary hypertension usually found in man at altitude. (Authors' summary, modified) (45 references)

7301

Rotta, A.,
and others
[PULMONARY CIRCULATION AT HIGH ALTITUDES] La circulación pulmonar en las grandes alturas.—*Anales de la Facultad de medicina, Universidad nacional mayor de San Marcos de Lima (Peru)*, 40 (4): 908-928. 1957. In Spanish, with English summary (p. 922). DNLN

A moderate, but significant degree of pulmonary hypertension was found in men living at an altitude of 4,540 meters (Morococha, Peru). This condition was more marked in native residents than in temporary residents and more accentuated in cases of chronic mountain sickness. The probable pathogenesis of this hypertension is discussed in relation to the degree of anoxia, total blood volume, pulmonary blood volume, and minute volume. (42 references)

7302

Saldarriaga, J.
[SOME CLINICAL OBSERVATIONS ON TUBAL PREGNANCY AT ALTITUDE] Algunas observaciones clínicas sobre el embarazo tubario en la altura.—*Revista de la Asociación médica de la provincia de Yauli (La Oroya)*, 2 (1): 24-26. Jan.-March 1957. In Spanish. DNLN

A study of patients hospitalized at La Oroya, Peru (3,800 meters above sea level) with tubal pregnancy reveals an atypical clinical picture with a calm evolution. Factors possibly contributing to these phenomena are polycythemia usually associated with persons living at altitude, and a tendency towards proliferative collagen reactions.

7303

San Martín F., M.,
Y. Prato M., L. Fernández Cano, A. Vargas C., H. Andresen, A. Calderón, S. Fernández Baca, and J. Salcedo M.
[SPERMATIC CONCENTRATION, NORMAL SPERMATOZOA AND EXCRETION OF 17-KETOSTEROIDS IN ALTITUDE CHANGES ALONE OR COMBINED WITH HORMONE TREATMENT] Concentración espermática, espermatozoides normales y excreción de 17-cetoesteroides en cambios de altitud solos o asociados a tratamientos hormonales.—*Revista de la Facultad de medicina veterinaria de la Universidad nacional mayor de San Marcos (Lima)*, 12: 1-14. Dec. 1957. In Spanish, with English summary (p. 13). DNLN

A decrease was found in the concentration of semen and normal spermatozoan count of rabbits exposed to high altitude (4,650 meters) alone, or associated with ACTH or pregnant-mare serum gonado-

tropin treatment. At sea level, initial ACTH treatment increased the number of spermatozoa, but these numbers decreased by the end of treatment. On the other hand, serum gonadotropin, after an initial depressive effect, produced a stimulative effect on both semen concentration and the number of normal spermatozoa. These changes indicate that the association of high altitude with ACTH aggravates the effect of altitude on the germinal epithelium, whereas gonadotropin has a protective effect. High altitude produced an increase in the urinary excretion of 17-ketosteroid metabolites; associated ACTH treatment did not alter the excess excretion, but gonadotropin induced an even greater excretion. Adaptation to high altitude caused the development of adaptive mechanisms with a predominance of anabolic processes, especially in protein metabolism.

7304

Santa Maria, L. J.,
and H. R. Greider

GASEOUS CAVITY FORMATION IN EXPLOSIVELY DECOMPRESSED ANIMALS.—*Jour. Aviation Med.*, 28 (2): 303-308. June 1957. DLC (RC1050.A36, v. 28)

Rats were explosively decompressed from sea level to 80,000 ft. with exposure times of 5 and 30 seconds, and quick-frozen. In both cases the sites of cavity formation were the heart, thorax, abdomen, and intermuscular tissues. Only the intermuscular cavities were larger for the longer exposures. When explosively decompressed rats were recompressed after 30 to 60 seconds at altitude, the sites of cavity formation were generally the same. Those persisting after 60 seconds' exposure, however, appeared to be larger than those persisting after 30 seconds at altitude. (Authors' summary, modified.)

7305

Sauerbrei, H. U.

[FETAL MICROCEPHALIA DUE TO EXPOSURE TO LOW-PRESSURE TREATMENT OF A PREGNANT WOMAN IN A CLIMATIC CHAMBER DURING PREGNANCY] Fatale Mikrozephalie durch Unterdruckbehandlung einer Graviden in der Klimakammer.—*Kinderärztliche Praxis (Leipzig)*, 25 (11): 490-492. Nov. 1957. In German. DNLM

A case history of a microcephalic child is described. The child's mother was exposed to 3000-3800 m. simulated altitude during the 5th to 8th weeks of pregnancy while her oldest child was undergoing treatment for whooping cough in the altitude chamber, a total of eight sessions of 50 minutes each.

7306

Scano, A.

[RESULTS OF 270 EXPLOSIVE DECOMPRESSION TESTS IN MAN] Risultati di 270 prove di decompressione esplosiva nell'uomo.—*Rivista di medicina aeronautica (Roma)*, 20 (3): 441-449. July-Sept. 1957. In Italian, with English summary (p. 446). DLC (RC1050.R56, v. 20)

Two hundred and seventy military jet pilots (20-40 years of age) were explosively decompressed from a simulated altitude of 526 to 365 mm. Hg in about 0.3 seconds. The subjects were then recompressed to normal barometric pressure. No one showed significant disorders during or after explosive decompression. Following the test, a mean increase was observed in the heart rate (16.2%). This phenomenon occurred in almost all subjects and lasted for a short time. The electrocardiogram, in the peripheral and

unipolar leads, showed no particular morphological variations or changes of the pre-existing alterations. It is concluded that normal men, under the above mentioned experimental conditions, are able to tolerate a pressure change of about 180 mm. Hg (about 1/4 of an atmosphere) without consequences.

7307

Schaefer, K. E.,

W. McNulty, and C. Carey

DEVELOPMENT OF AIR EMBOLISM [Abstract].—*Federation Proceedings*, 16 (1, part I): 113. March 1957. DLC (QH301.F37, v. 16)

Dogs were decompressed within 2 minutes with the trachea closed. The pressure gradient between intratracheal and intrapleural pressure (transpulmonic pressure) was found to be the decisive factor in producing air embolism. The critical level of transpulmonic pressure was 60-70 mm. Hg. When binders were placed around the chest and abdomen, they prevented distention of the lungs and kept the transpulmonic pressure from reaching a critical value. Abdominal binders failed to give protection against air embolism. In every case of air embolism bubbles were found in the carotid artery bubble trap. A transient circulatory failure (all circulatory pressures in the pulmonary as well as in the systemic circulation approaching the same level, with a simultaneous disappearance of pulse pressure) occurred whether or not air embolism developed, and was therefore not the cause of air embolism. (Authors' abstract, modified)

7308

Shternshis, S. Z.

[PECULIARITIES OF THE CLINICAL COURSE OF CROUPOUS PNEUMONIA IN MOUNTAINOUS REGIONS] Osobennosti klinicheskogo techeniya krupoznoi pneumonii v vysokogornoi mestnosti.—*Voenno-meditsinskiy zhurnal (Moskva)*, 1957 (2): 82-85. Feb. 1957. In Russian. DLC (RC970.V55, v. 1957)

Among the nonacclimatized military personnel stationed in Transcaucasia (1650-2200 m. above sea level) in 1952-53, the incidence of lobar to focal pneumonia was 1:4. By 1954, the incidence of grippe and grippous pneumonia, and of upper respiratory catarrhs was decreased while croupous pneumonia increased. Its course, in mountainous regions, is more severe. Treatment with narcotics, sulfa and cardiac drugs proved to be ineffective. Hypoxemia was evident in the early course of the disease. 78% of patients showed tendency for arterial hypotension and longlasting tachycardia. ECG changes and increases in leukocyte and erythrocyte counts and hemoglobin were evident.

7309

Tappan, D. V.,

B. Reynafarje D., V. R. Potter, and A. Hurtado
ALTERATIONS IN ENZYMES AND METABOLITES RESULTING FROM ADAPTATION TO LOW OXYGEN TENSIONS.—*Amer. Jour. Physiol.*, 190 (1): 93-98. July 1957. DLC (QP1.A5, v. 190)

Succinoxidase activity has been demonstrated to be significantly higher in the tissues of guinea pigs native to altitudes of 14,000-14,900 feet than in sea-level guinea pigs. Deoxyribonucleic acid content is higher in the tissues of the altitude animals, indicating a larger number of cells per gram of tissue

with a constant amount of succinoxidase activity per cell. Antimycin A titer, which varies little with altitude, and cytochrome c oxidase, which is increased in some tissues of altitude guinea pigs, indicates that altitude acclimatization may be aided by increases in key reactions of enzyme series, avoiding the necessity for changes at all of the steps of the series. Altitude animals have increased glycolysis and adenosinetriphosphatase capacities and accumulate higher levels of high-energy phosphate. Animals moved from one altitude to the other show changes in enzyme concentrations indicative of acclimatization. (Authors' abstract)

7310

Tappan, D. V.,

and B. Reynafarje D.

TISSUE PIGMENT MANIFESTATIONS OF ADAPTATION TO HIGH ALTITUDES.—*Amer. Jour. Physiol.*, 190 (1): 99-103. July 1957. DCL (QP1.A5, v. 190)

Guinea pigs from local stock in Peru were used to study the myoglobin, hemoglobin, and cytochrome c content in tissues of animals at sea level and 14,900 ft. The pigments were extracted by various methods and the values read colorimetrically. The results show a significant increase in blood hemoglobin in the high-altitude animals, while cytochrome c and myoglobin show a smaller increase. A significant increase in myoglobin occurred in only some skeletal muscles, in the heart and the liver. Myoglobin, which could act as a vehicle for carrying oxygen or as a catalyst in oxidation, would in greater amounts raise the efficiency of oxygen utilization at high altitudes. An increase in cytochrome c could be advantageous to animals carrying out oxidative reactions at high altitudes.

7311

Tasler, J.

[THE EFFECT OF DECREASED ATMOSPHERIC PRESSURE ON PHOSPHORUS CONTENT IN THE ERYTHROCYTES] Wpływ obniżonego ciśnienia atmosferycznego na zawartość fosforu w erytrocytach. — *Acta physiologica polonica* (Warszawa), 8 (3-3a): 544-545. 1957. In Polish.

DLC (QP1.A27, v. 8)

Organic phosphorus content in the erythrocytes increased in rabbits exposed to reduced atmospheric pressure, returning to normal not before the 5th day of such exposure. The amount of inorganic phosphorus progressively increased and remained increased on the 6th day. Inorganic plasma phosphorus remained unchanged. It can be said that inorganic phosphorus is one of the factors that increase resistance of erythrocytes to the effects of decreased atmospheric pressure.

7312

Timiras, P. S.,

A. A. Krum, and N. Pace

BODY AND ORGAN WEIGHTS DURING ACCLIMATIZATION TO AN ALTITUDE OF 12,470 FEET. — *Amer. Jour. Physiol.* 191 (3): 598-604. Dec. 1957. DLC (QP1.A5, v. 191)

Body and organ weights of rats kept at sea level were compared with those of rats (P) born at sea level and then exposed to 12,470 ft. and with those of rats of the second filial generation (F₂) born and kept at 12,470 ft. for periods up to 10 months. Body weight was lower from the fifth day of age in the F₂ rats than in either the sea level or P

rats. Weight gain dropped in the P rats at 72 hours, became normal at 1 week to 6 months and dropped again after 7-10 months. Weight gain in the F₂ rats dropped from normal after five days and always remained smaller than in the sea level or P rats. Cardiac hypertrophy in P rats occurred after 10 months of exposure, and hemoglobin values increased after 2 months. An increase of 40% in adrenal weight was accompanied by thymic and lymphatic atrophy, but these changes did not occur in the F₂ rats.

7313

Timiras, P. S.,

1957

N. Pace, and C. A. Hwang

PLASMA AND URINE 17-HYDROXYCORTICOSTEROID LEVELS IN MAN DURING ACCLIMATIZATION TO HIGH ALTITUDE [Abstract]. — *Federation Proceedings*, 16 (1, part I): 340. March 1957.

DLC (QH301.F37, v. 16)

After exposure of 6 men to altitude (12,470 ft.), urinary excretion of 17-hydroxycorticosteroids and of 17-ketosteroids was increased by as much as 300% and 50%, respectively, over sea level (250 ft.) values. Similarly, plasma levels of 17-hydroxycorticosteroids were higher at altitude than at sea level with a maximum increase of 115%. On the other hand, the urine and plasma levels of adrenocortical hormones and their metabolites appeared to be related to the duration of the exposure and the degree of acclimatization. They rose during the first 3 days of each sojourn at altitude and then returned toward the sea level values. In addition, the magnitude of these changes decreased in successive sojourns. The observations suggest that exposure to altitude stimulates in man adrenocortical activity but that the increase in the levels of the adrenocortical hormones is only temporary. (From the authors' abstract)

7314

Udalov, Iu. F.

[THE EFFECT OF HIGH-ALTITUDE ASCENTS ON THE METABOLISM OF VITAMINS B₁ AND B₂ IN THE HUMAN ORGANISM] O vliyanii vysotnykh pod'emov na obmen vitaminov B₁ i B₂ v organizme cheloveka [Abstract]. — *Voenno-meditsinskii zhurnal* (Moskva), 1957 (7): 79-80. July 1957. In Russian. DLC (RC970.V55, v. 1957)

The metabolism of vitamins B₁ and B₂ was studied in subjects fed a normal diet with adequate vitamin content. The urinary excretion of the vitamins was measured one day prior to the ascent in the decompression chamber and on the day of the ascent to 10,000 m. altitude for 10 hours, or to 15,000 m. altitude for 15 minutes. Oxygen apparatus was used during the ascents. There was a decrease of B₁ and B₂ excretion at simulated altitude. If in controls the excretion of B₁ was 54.8 gamma/day, and that of B₂ 22.1 gamma/day, on the day of the experiment it was reduced to 36.6 and 17.3, respectively. This suggests that high altitude may lead to an increased need of vitamins. Vitamin supplements to the diet led to their increased excretion on the day of the ascent to 110 gamma and 87.6 gamma, respectively.

7315

Udalov, Iu. F.

INFLUENCE OF NOVOCAIN ON THE TOLERANCE OF HIGH ALTITUDES BY WHITE RATS. — *Bull.*

Exper. Biol. and Med. (Consultants Bureau, New York), 42 (8): 692-694. 1957. DLC (R850.B6, v. 42)
English translation of item no. 5897, vol. V.

7316

Vacca, C.,
and A. Capobianco
[HEMATOLOGICAL VARIATIONS OF ARTERIAL PRESSURE AND RESPIRATION IN RABBITS SUBJECTED TO EXPLOSIVE DECOMPRESSION] Variazioni ematologiche della pressione arteriosa e della respirazione in conigli sottoposti a "decompressione esplosiva".—*Rivista di medicina aeronautica* (Roma), 20 (3): 391-405. July-Sept. 1957. In Italian, with English summary (p. 402-403).

DLC (RC1050.R56, v. 20)

Simultaneous recordings were made of arterial pressure at the level of the carotid, and of respiratory movements in tracheotomized and anesthetized rabbits explosively decompressed from 760 to 123.7 mm. Hg within 8-12 seconds. A sudden increase in arterial pressure was registered followed by a decrease. Apnea occurred due to thoracic dilatation in the inspiratory phase, and lasted until the beginning of recompression. Hemoconcentration of arterial blood caused by a loss of fluids from the lungs was also observed along with involvement of the hypophyseal-adrenal axis in which explosive decompression represented the stress with a hypoxic component. Variations in characteristic body lesions, essentially of the hemorrhagic type, represent adaptation mechanisms of the body to sudden environmental changes of pressure.

7317

Valdivia, E.
HYPERTROPHY OF THE HEART IN GUINEA PIGS LIVING AT SIMULATED HIGH ALTITUDE [Abstract].—*Federation Proceedings*, 16 (1, part I): 375. March 1957. DLC (QH301.F37, v. 16)

Marked hypertrophy of the right ventricle appeared at the end of the second week and became conspicuous at the end of the fourth week in 22 guinea pigs kept at simulated high altitude (18,000 ft.). The left ventricle also presented minimal hypertrophy, as well as both atrial walls, especially the right. It is possible that several factors may be of etiologic significance. Chronic hypoxia acting upon the myocardium does not alone explain the findings because of the inequality of the hypertrophy of the ventricles. Increase in the total blood volume affects primarily the left ventricle. Increased pressure or other changes in the pulmonary vascular bed may be the significant cause. (Author's abstract, modified)

7318

Valdivia, E.
RIGHT VENTRICULAR HYPERTROPHY IN GUINEA PIGS EXPOSED TO SIMULATED HIGH ALTITUDE.—*Circulation Research*, 5 (6): 612-616. Nov. 1957. DLC (RC681.A1A57137, v. 5)

Guinea pigs were exposed to a simulated altitude of 18,000 ft. for periods of 1 to 28 weeks. Progressive hypertrophy was demonstrated in the right ventricle during the first 6 weeks of exposure, after which the weight of the right ventricle remained constant. Because a fundamental general mechanism such as anoxia of the myocardium or generalized arterial hypertension would not have caused hypertrophy of only the right ventricle, it is postulated that the effects were primarily due to pulmonary hypertension. (Author's summary, modified)

7319

Violette, F.,
and R. Senelar
[PRELIMINARY RESEARCH ON THE VARIATION OF PULMONARY LESIONS IN RELATION TO PRESSURES IN EXPLOSIVE DECOMPRESSION AND ON THE CAUSES OF SEVERITY OF REPEATED DECOMPRESSIONS] Recherches préliminaires sur la variation des lésions pulmonaires en fonction du rapport des pressions dans les décompressions explosives et sur les causes de gravité des décompressions itératives.—*Comptes rendus de l'Académie des sciences* (Paris), 244 (23): 2843-2845. June 3, 1957. In French. DLC (Q46.A14, v. 244)

In guinea pigs explosively decompressed to various levels, hemorrhagic lesions were histologically demonstrated. Repeated decompression showed significant extension of the hemorrhagic foci, probably due to erythrodiapedesis following fracture of venules after the first decompression.

7320

Vitenzon, A. S. 1957
[STUDY OF VISUAL AFTERIMAGES] K voprosu issledovaniia zritel'nykh sledovykh reaktsii [Abstract].—*Voenno-meditsinskii zhurnal* (Moskva), 1957 (11): 79-80. Nov. 1957. In Russian. DLC (RC970.V55, v. 1957)

Thirty-five healthy persons serving as controls and 116 patients with functional and organic diseases of the central nervous system were studied. The control group had normal vision. After a period of dark adaptation, the subject looked at a fixed light point for 15 seconds, repeating the test after 4-5 minutes. The duration of the latent period of the after-image was determined, as well as the duration of the after-image itself. In the control group the latent period lasted 0.5-6 seconds, and the after-image 15-30 seconds. In the decompression chamber at 5000 m. simulated altitude (without oxygen breathing), the latent period in the control group increased by 1-2 seconds, while the duration of the after-image tended to decrease some 3 seconds. The cumulative effect of light and sound increased the latent period 1-2 seconds in normal persons without altering the after-image.

7321

Vozza, R.
[OPHTHALMOLOGICAL ASPECTS OF THE DECOMPRESSION SYNDROME WITH SPECIAL REGARD TO EXPLOSIVE DECOMPRESSION] Aspetti oftalmologici della sindrome da decompressione con particolare riguardo alla decompressione esplosiva.—*Rivista di medicina aeronautica* (Roma), 20 (3): 543-558. July-Sept. 1957. In Italian, with English summary (p. 554). DLC (RC1050.R56, v. 20)

Rabbits were explosively decompressed with pressure gradients of 314, 364, 669, 705, and 738 mm. Hg. Soon after decompression marked exophthalmos was observed, probably related to gaseous diffusion phenomena in the orbital tissue. Exophthalmos disappeared after recompression. Ophthalmoscopic and histologic examinations revealed dilatation and congestion of the corio-retinal vessels. No other changes were found. The absence of ocular lesions following explosive decompression is attributed to the fact that the hypertensive wave, created by increased pressure at the thoraco-abdominal level, comes to an end at the level of the eye due to the characteristic angulation of the ophthalmic artery from the carotid trunk.

7322

Whiteside, T. C. D.

THE PROBLEMS OF VISION IN FLIGHT AT HIGH ALTITUDE.—(AGARDograph no. 13). xv+162 p.
London: Butterworths Scientific Publications, 1957.
DLC (TL500.N6, no. 13)

A historical survey (including beginnings of aviation medicine, early visual problems, new visual problems) and experimental work and observations are presented of visual problems peculiar to high-altitude flight. Experimental work described includes: (1) effects of changes in intensity and spectral distribution of sunlight at high altitude, (2) physiological changes affecting visibility of objects inside the cockpit, and (3) physiological factors affecting air-to-air visibility. Integration of findings from these investigations indicates two basic causes for the problems: one is the reversal of light distribution at high altitude where the bright sky (formed by cloud and haze) is below the darker blue sky above; the other is the clear blue sky which is frequently present in the hemisphere above the horizon—a sky without trace of a cloud and constituting an empty visual field. The reversed light distribution is responsible for the glare problems, particularly with regard to visibility in the cockpit; the clear blue sky affects vision outside the cockpit (judgment of speed, size, and distance of target, and particularly air-to-air search). (98 references)

7323

Wolf, J.

[SOME MEDICAL OBSERVATIONS MADE DURING THE CZECHOSLOVAK EXPEDITIONS TO THE MONT BLANC MOUNTAIN RANGE IN 1955 AND 1956] Někteří lékařské zkušenosti z československých výprav do masivu Mont Blanc 1955 a 1956.—*Teorie a praxe tělesné výchovy a sportu* (Praha), 5 (10): 604-613. 1957. In Czech, with English summary (p. 613).
DLC (GV201.T38, v. 5)

A summary is presented of the medical and physiological observations of two Czech expeditions to the Mont Blanc range in 1955 and 1956. The good physical condition of the participants was proven by achievements in sports and by physiological observations. Low-pressure chamber tests showed high resistance to anoxia. Other tests included the functions of the cardiovascular, nervous, and hematopoietic systems. The reaction to the fatigue test of Strumza and Rolland differed at altitude from that shown before the expedition.

7324

Zolese, A.

[AERODONTALGIA AND ITS POSSIBLE RELATIONS TO VARIATIONS OF INTERDENTAL SPACES IN BAROMETRIC DEPRESSION] L'aerodontalgia ed i suoi possibili rapporti con le variazioni degli spazi interdentali in depressione barometrica.—*Rivista di medicina aeronautica* (Roma), 20 (4): 610-618. Oct.-Dec. 1957. In Italian, with English summary (p. 617).
DLC (RC1050.R56, v. 20)

An increase was found in the interdental spaces of 17 subjects decompressed to a simulated altitude of 4000 meters for 30 minutes. In a total of 102 measurements, the spaces were 0.071 mm. at sea level, 0.094 at 4000 meters while breathing air, and 0.084 at 4000 meters breathing oxygen. Changes in the interdental spaces during decompression were unequal and oxygen breathing attenuated the phenomenon. Since pain is only a subjective symptom, it is stressed that dental physiopathology in relation

to flight be oriented objectively in order to obtain valid scientific data. Measurement of the millimeter fractions of dental motility may provide better results.

e. Anoxia

[Hyperoxia, hypocapnia, etc., under 3-c]

7325

Altland, P. D.,

O. Mickelsen, and B. Highman

EFFECTS OF EXPOSURE OF OBESE RATS TO SIMULATED HIGH ALTITUDES.—*Amer. Jour. Physiol.*, 191 (2): 371-376. Nov. 1957.
DLC (QP1.A5, v. 191)

Obese rats, when exposed to 18,000 or 25,000 ft. simulated altitudes 6.5 hours a day, 5 days a week and for 4-6 months, developed the same degree of polycythemia and had the same mortality rate as non-obese controls. The obese rats showed a slightly higher incidence of cardiovascular defects, and heart weights of all rats increased 70% after 191 days of exposure. In acute altitude tests at 33,500 ft. obese rats died within 86 minutes, while 60% of the non-obese controls survived for longer periods. Preoxygenation of the test chamber prevented early deaths in obese rats. Adipose tissue acts as a reservoir for N₂, and this may increase the possibility of fatal aeroembolism in obese rats. The lack of fat emboli in the lungs or brain indicates that such emboli have little importance in acute altitude death.

7326

Amassian, V. E.

EFFECT OF HYPOXIA AND ISCHEMIA ON CORTICAL, THALAMIC AND MIDBRAIN RETICULAR NEURONS [Abstract].—*Federation Proceedings*, 16 (1, part I): 3. March 1957. DLC (QH301.F37, v. 16)

Spontaneous electrical activity and activity evoked by cal forepaw, thalamic, or cortical stimulation was observed in records from medial lemniscus, midbrain reticular formation, medial and ventroposterior thalamic nuclei, internal capsule, somatosensory areas I and II and pyramidal tract. Spontaneous (including burst) activity in the cortex and medial thalamus practically disappeared before or when the arterial oxygen saturation fell below 10%. Early evoked somatosensory cortical responses, pyramidal responses, and evoked activity in single cortical neurons persisted many seconds later. Activities of individual reticular neurons markedly differed in susceptibility to hypoxia, the activity disappearing either when cortical spontaneous activity disappeared or later. The latency of evoked discharge usually increased prior to loss of response. Thus, transmission of short-delay evoked discharges within the cortex is less sensitive to hypoxia than is the subcortical mechanism with drives cortical "spontaneous" activity. (From the author's abstract)

7327

Aviado, D. M.,

J. S. Ling, and Carl F. Schmidt

EFFECTS OF ANOXIA ON PULMONARY CIRCULATION: REFLEX PULMONARY VASOCONSTRICTION.—*Amer. Jour. Physiol.* 189 (2): 253-262. May 1957.
DCL (QP1.A5, v. 189)

Anoxia in dogs caused by exposure to 5 or 10% oxygen produces increased pulmonary arterial pressure, increased pulmonary blood flow, but variable pulmonary vascular resistance. Four factors effect the pulmonary vascular resistance: (1) reflex pulmonary vasoconstriction, (2) local pulmonary vasodilatation, (3) passive reduction in pulmonary vascular resistance, and (4) release of epinephrine capable of stimulating the heart and constricting the lung vessels. The reflex pulmonary vasoconstriction is mediated by the thoracic sympathetics and is activated by less severe anoxemia (reduction of arterial O_2 saturation by at least 10%) as compared to the other mechanisms (local and passive dilatation which require reduction of saturation of at least 30%). (Authors' abstract, modified) (26 references)

7328

Bajwa, P. S.

UNCONSCIOUSNESS IN FLIGHT: A CASE REPORT.—*Aero Med. Soc. Jour. (New Delhi)*, 4 (1): 15-18. Dec. 1957. DNLN

A case is reported of a pilot who became unconscious at an altitude of 23,000 feet followed by quick recovery upon descent to a lower altitude. Hypoxia may have contributed to the phenomenon if oxygen failure occurred due to disconnection between the oxygen mask and the corrugated rubber tubing, especially under the effect of slight g. Contrary to instruction the tube had not been properly secured to the mask. It is also probable that the associated effects of apprehension or concomitant g altered the onset of severe symptoms of hypoxia.

7329

Barbashova, Z. I.

[THE REACTION OF RATS WITH REMOVED SUPERIOR CERVICAL SYMPATHETIC GANGLIA TO ACUTE AND CHRONIC HYPOXIA] Reaktsiia na ostruiu i khronicheskuiu gipoksiu u krysa s udalennymi verkhnimi sheinymi simpaticheskimi uzlamy. —*Doklady Akademii nauk SSSR (Moskva)*, 115 (2): 414-417. July 1957. In Russian.

DLC (AS262.S3663, v. 115)

The removal of the superior cervical sympathetic nerves and ganglia did not alter the behavior of rats exposed to hypoxia in a pressure chamber. There was a decrease in respiratory activity in acute hypoxia usually resulting in Cheyne-Stokes respiration. Prolonged hypoxia during exposure to a simulated altitude of 13,000 m. produced hyperemia, increased respiratory rate and red blood count in experimental and control groups alike. Irradiation with radioactive cobalt (970 r.) was less injurious to gangliectomized animals acclimatized to anoxia than to the nonacclimatized ones.

7330

Berne, R. M.,

J. R. Blackmon, and T. H. Gardner

HYPOXEMIA AND CORONARY BLOOD FLOW. —*Jour. Clinical Investigation*, 36 (7): 1101-1106. July 1957. DLC (R11.J67, v. 36)

In experiments on open-chest dogs and on fibrillating heart preparations, reduction of oxygen content of arterial blood produced increases in coronary blood flow only when coronary sinus oxygen levels fell below about 5.5 volumes per cent. High perfusion pressures were employed in order to increase coronary flow to the extent that coronary sinus blood became relatively rich in oxygen. Under

these conditions it was possible to demonstrate that a moderate lowering of arterial oxygen content does not decrease coronary resistance by a direct action on the vessel walls. Coronary vasodilatation in hypoxemia appears to be related to myocardial hypoxia. (Authors' summary)

7331

Bjerver, K.,

and P. A. Persson

THE EFFECT OF HYPOXIA ON STANDING STEADINESS.—*Archives internationales de pharmacodynamie et de therapie (Gand)*, 112 (3-4): 247-263. 1957. DNLN

In comparison to control tests, the inhalation of 10% oxygen in nitrogen had a significant effect on the subjects' standing steadiness, leading to an increase in the area of sway. This corresponds to a statistically significant impairment in coordination. Standing steadiness was continuously recorded with a specially constructed statometer and arterial oxygen saturation recorded by an oximetric method.

7332

Boeles, J. T. F.

THE INFLUENCE OF STAGNANT ANOXIA ON THE CEREBRAL CORTEX.—In: The first European congress of aviation medicine, p. 203-205. *Aeromedica acta* (Soesterberg, Netherlands), Special edition, 1957. In English. DNLN

Research on recovery from stagnant anoxia is reviewed to establish the minimum duration of oxygen lack which will result in irreversible brain damage. A permanent recovery of the normal electroencephalographic pattern could be obtained in the cat after occluding the circulation for eight minutes. However, after interruption of the circulation for that length of time the return of a simple conditioned reflex was delayed and slow and the reactions of the animal remained sluggish. An occlusion for six minutes was followed by a return of the conditioned reflex within one to two days. The reflex was slow the first day but normalized rapidly later. In view of these findings the author suggests six minutes as the maximum revival time of the cerebral cortex.

7334

Brodie, H. R.,

K. W. Cross, and T. R. Lomer

HEAT PRODUCTION IN NEW-BORN INFANTS UNDER NORMAL AND HYPOXIC CONDITIONS.—*Jour. Physiol. (London)*, 138 (1): 156-163. Aug. 1957. DLC (QP1.J75, v. 138)

Ten one-week-old infants were exposed to 15% O_2 for 50 minutes in a body plethysmograph. The temperature to which the plethysmograph was raised above the room temperature was used as a measure of heat loss from the infant. In the air-breathing controls the rate of loss was significantly higher than in the hypoxic infant. It is concluded that the rates of heat loss observed here indicate that the baby breathing 15% O_2 produces less body heat than the normal child, and this is associated with the ability of the newborn to survive prolonged anoxia.

7335

Brown, John L.,

J. H. Hill, and R. E. Burke

EFFECT OF HYPOXIA ON THE HUMAN ELECTRORETINOGRAM.—*Amer. Jour. Ophthalmol.*, 44 (1): 57-67. July 1957. DNLN

Hypoxia was induced in two subjects by having them breathe, at atmospheric pressure, oxygen-nitrogen mixtures which contained lower percentages of oxygen than that found in normal air. The amplitude of the electroretinographic response to stimulation by red light was reduced by more than 5% while subjects breathed a mixture containing 9% oxygen. This mixture is equivalent to the atmosphere at an altitude of 20,000 feet. (From the authors' summary) (28 references)

7336

Bureš, J.,

and O. Burešová

[THE ANOXIC TERMINAL DEPOLARIZATION AS AN INDICATOR OF VULNERABILITY OF THE CEREBRAL CORTEX IN ANOXIA AND ISCHEMIA] Die anoxische Terminaldepolarisation als Indikator der Vulnerabilität der Grosshirnrinde bei Anoxie und Ischämie.—Pflügers Archiv für die gesamte Physiologie (Berlin), 264 (4): 325-334. 1957. In German. DLC (QP1.A63, v. 264)

The electrical polarity of the surface of cerebral cortex (in rats about 20 millivolt positive) declines rapidly after a few minutes of total brain anoxia or ischemia. The latency of terminal depolarization approaches the latency of irreversible anoxic damage to the cerebral cortex. In hypothermic animals terminal depolarization is delayed considerably. In the normothermic rat cortical polarity drops to zero after 15 min. of ischemia; in the hypothermic animal a residual polarity is still present at that time. Terminal depolarization is suggested as a new criterion for cortical survival time, which is closer to revival time than other commonly employed criteria, e.g., loss of spontaneous electrical activity.

7337

Bureš, J.

[THE INFLUENCE OF ANOXIA AND ASPHYXIA ON THE SPREADING EEG DEPRESSION] Vliv anoxie a asfyxie na šířící se EEG depresi.—Československá fysiologie (Praha), 6 (4): 467-471. Nov. 1957. In Czech. DLC (QP1.C414, v. 6)

Young rats were subjected to the anoxic state or exposed to asphyxia for 45 to 75 seconds. Potentials were measured at various points on the cortex. During asphyxia, 45 seconds was the shortest time exposure that could maintain the widening depression. At this time, period negativity decreased within the first 15 seconds but then returned to normal. Above 45 seconds, widening of the depression increased with continuing exposure. Above 75 seconds, paroxysmal activity was observed. During anoxia, polarity dropped off to one-half of its original value, and the potential was depressed. It appeared that in both asphyxia and anoxia there was an inhibition of oxidative processes.

7338

Colehour, J. K.,

H. Borsook, and A. Graybiel

THE EFFECT OF HYPOXIA ON THE SERUM IRON AND THE UNSATURATED IRON-BINDING CAPACITY OF SERUM IN RATS.—Calif. Inst. of Tech., Pasadena (Contract Nonr-220(9)); and Naval School of Aviation Medicine, Pensacola, Fla. (Project no. NM 12 01 99, Subtask 2). Report no. 2, July 16, 1957. ii+4p. AD 144 099 UNCLASSIFIED

Also published in: Amer. Jour. Physiol., 191 (1): 113-114. Oct. 1957. DLC (QP1.A5, v. 191)

The changes in concentration of unbound iron bind-

ing capacity (UIBC) and bound iron (BI) in rat serum under hypoxic stress are measured. After one day at altitude UIBC increases acutely and is followed by a decrease in BI on the second day. Reticulocytes reach peak values at four days while hematocrits were 30 per cent above starting values at the end of ten days. Twelve days after return to sea-level iron values were back to normal. (Authors' abstract)

7339

Creutzfeldt, O.,

A. Kasamatsu, and A. Vaz-Ferreira

[ACTIVITY CHANGES OF INDIVIDUAL CORTICAL NEURONS IN ACUTE ANOXIA AND THEIR RELATION TO THE EEG IN CATS] Aktivitätsänderungen einzelner corticaler Neurone im akuten Sauerstoffmangel und ihre Beziehungen zum EEG bei Katzen.—Pflügers Archiv für die gesamte Physiologie (Berlin), 263 (6): 647-667. 1957. In German. DLC (QP1.A63, v. 263)

The electrical discharges of single cortical neurons were compared with the electroencephalogram (EEG) of cats during nitrogen breathing for 50-60 seconds. After 10-20 seconds of N₂ breathing, the frequency of neuronal discharges and the frequency and amplitude of the fast beta-waves of the EEG were increased, while the 10/second wave of the EEG disappeared. Neuronal discharges were decreased abruptly 10-20 seconds later, in correlation with alpha activation of the EEG. Discharges then ceased in half the neurons, while the remainder continued to discharge in irregular bursts corresponding to slow gamma-waves. All activity disappeared in the neurons 20-40 seconds after initiation of N₂ breathing, and in the EEG after 25-45 seconds. Recovery after return to air breathing began in 10-120 seconds in individual neurons, and in 10-20 seconds in the EEG. Recovery was complete 2-3 minutes after initiation of air breathing. Anoxic muscular convulsions were not reflected in either the EEG or in the activity of single neurons.

7340

Csálay, L.,

I. Fenyves, B. Kelentel, and Gy. Ludány

[INVESTIGATION OF PATHOMECHANISM OF THE HYPOXIC INCREASE IN CEREBROSPINAL PRESSURE] Vizsgálatok a hipoxiás liquor nyomásnövekedés patomechanizmusára.—Kísérletes orvostudomány (Budapest), 9 (4): 374-380. Sept. 1957. In Hungarian, with English summary (p. 380) DNLM

Also German translation: Untersuchungen über den Pathomechanismus der hypoxischen Liquordrucksteigerung.—Acta medica Academiae scientiarum hungaricae (Budapest), 10 (4): 397-404. 1957. In German. DNLM

The mechanism responsible for the increase in cerebrospinal fluid pressure in hypoxia was investigated in respect to its susceptibility to various pharmacologic agents. The experiments were conducted with cats under chloralose anesthesia breathing a 6% O₂-N₂ mixture. Endogenous histamine mobilization through compound "48/80" increases the cerebrospinal fluid pressure; antihistaminics (Necantergan, Antistin, Sandostem, and Synopen) lower the hypoxic response by approximately 30%; Ergam and Gynergen which block the sympathetic nervous system, and calcium and Rutil which interfere with the permeability are without any effect on the response. (Authors' summary, modified)

7341

Csalay, L.,

G. Ludány, and A. Orthmayr

[THE EFFECT OF HYPOTHERMIA AND PHARMACOLOGIC HIBERNATION ON THE HYPOXIC INCREASE IN THE CEREBROSPINAL FLUID PRESSURE] Hipotermia és farmakológiai hibernáció hatása a hipoxiás liquor nyomásnövekedésre.—Kísérletes orvostudomány (Budapest), 9 (4): 370-374. Sept. 1957. In Hungarian, with German summary (p. 374).

Also published by: Acta medica Academiae scientiarum hungaricae (Budapest), 10 (4): 415-420. 1957. In German.

DNLM

Experiments were conducted with cats under chloralose anesthesia, investigating the effect of exogenous and pharmacologic hypothermia on the increase of cerebrospinal fluid pressure while breathing a hypoxic mixture. During hypothermia the hypoxic increase of cerebrospinal fluid pressure is lowered on the average by 41%. Pharmacologic hibernation has a similar effect. Largactil alone does not influence this response. Phenergan lowers the hypoxic increase in spinal fluid pressure by 27%. (Authors' summary, modified)

7342

Di Maria, G.,

A. Spina, and M. Deodato

[STUDIES ON EXPERIMENTAL HYPOXIA. III. EFFECT OF ADENOSINE-TRIPHOSPHORIC ACID (ATP) ON THE MYOCARDIAL FIBER OF GUINEA PIGS SUBJECTED TO CHRONIC EXPERIMENTAL HYPOXIA AND TUBERCULIN POISONING] Studi sull'ipossia sperimentale. III. Influenza dell'acido adenositri-fosforico (ATP) sulla fibra miocardica di cavie sottoposte ad ipossia cronica sperimentale ed intossicazione tubercolinica.—Giornale di medicina e fisiologia (Roma), 6 (2): 165-182. 1957. In Italian, with English summary (p. 180-182). DNLM

Adenosine triphosphoric acid injected intramuscularly in guinea pigs subjected to chronic hypoxia was capable of notably limiting cardiac hypertrophy and degenerative lesions and also caused regression in the changes of the terminal phase of the electrocardiogram taken during the experiment.

7343

Donhoffer, Sz.,

Gy. Mestyan, L. Nagy, and Gy. Szegvári

[ON THE MECHANISM OF THE HYPERTHERMIC INCREASE AND THE HYPOXIC DECREASE OF ENERGY METABOLISM] Über den Mechanismus der hyperthermischen Steigerung und der hypoxischen Senkung des Energiewechsels.—Acta neurovegetativa (Wien), 16 (1-4): 390-399. 1957. In German. DNLM

The increase in oxygen consumption elicited regularly in the intact rat by hyperthermia is generally considered to be a direct consequence of the rise in body temperature and is explained by the operation of van't Hoff's law. In experiments performed on thyroidectomized rats, bilateral hypothalamic and epithalamic lesions disprove this assumption and demonstrate conclusively the central nervous origin of the increase in the metabolic rate. A similar conclusion was reached in regard to the metabolic effect of hypoxia; for epithalamic lesions may abolish the decrease in O_2 consumption and body temperature observed invariably in the intact animal under similar conditions. (Authors' summary)

7344

Foldi, M.,

F. Solti, E. Koltay, K. Megyesi, J. Rév, and J. Szász

EFFECT OF HYPOXIA ON KIDNEY FUNCTION IN PATIENTS WITH RENAL DISEASE.—Acta medica Academiae scientiarum hungaricae (Budapest), 10 (3): 335-338. 1957. In English. DNLM

In patients with renal disease arterial hypoxia induced by breathing of an O_2 - N_2 mixture does not lead to characteristic changes in the renal function. In normal subjects exposed to hypoxia diuresis decreased to 50% of the initial value, sodium excretion to 57%, glomerular filtration rate to 52%, and the effective renal plasma flow to 34% of the initial average values.

7345

Fumagalli, G.,

and M. Mezzano

[THE EFFECTS OF COCARBOXYLASES ON RESPIRATION DURING ACUTE HYPOXIA] Gli effetti della cocarbossilasi sulla respirazione durante l'ipossia acuta.—Rivista di medicina aeronautica (Roma), 20 (4): 619-631. Oct.-Dec. 1957. In Italian, with English summary (p. 629).

DLC (RC1050.R56, v. 20)

Coccarboxylase was administered intravenously to six subjects between 16 and 25 years of age who then breathed a hypoxic mixture (8.6% oxygen). A decrease in oxygen consumption was observed during the first six minutes of the experiment along with an increase in the respiratory quotient which lasted until the end of the experiment (30 minutes). Several electrocardiographic changes were also found. Coccarboxylase appears to provide the body with a better tolerance to acute hypoxia as indicated by the respiratory adaptation to hypoxic stress and the utilization of oxygen at the tissue level.

7346

Fumagalli, G.,

and M. Mezzano

[EFFECTS OF DIPHOSPHOPYRIDINE-NUCLEOTIDE ON RESPIRATION DURING ACUTE HYPOXIA] Gli effetti del difosfopiridin-nucleotide sulla respirazione durante l'ipossia acuta.—Rivista di medicina aeronautica (Roma), 20 (4): 644-675. Oct.-Dec. 1957. In Italian, with English summary (p. 672-673).

DLC (RC1050.R56, v. 20)

Young subjects were given diphosphopyridine-nucleotide (DPN) intravenously and subjected to hypoxia. In comparison with previous research in which coccarboxylase was used there was found: (1) a decrease in oxygen consumption during the first 6 minutes of the experiment, less marked than when coccarboxylase was administered; (2) a remarkable increase in oxygen consumption after 30 minutes, attaining higher values than those observed in simple hypoxia; (3) a high increase in the respiratory quotient after 6 minutes followed by a decrease after 30 minutes, due chiefly to increased oxygen consumption; and (4) a lower intensity of electrocardiographic signs indicating lower myocardial cell motility in response to hypoxic stimulation. DPN provides higher resistance to hypoxia and better protection to the myocardium than does coccarboxylase.

7347

Fumagalli, G.,

and M. Mezzano

[RESPIRATION DURING ACUTE HYPOXIA IN THE NORMAL SUBJECT: CRITICAL ANALYSIS. I.] La respirazione durante ipossia acuta nel soggetto normale: analisi critica. I.—Rivista di medicina aereo-

nautica (Roma), 20 (2): 235-248. April-June 1957. In Italian, with English summary (p. 246).

DLC (RC1050.R56, v. 20)

Normal subjects at rest breathing a gas mixture containing 11.27% of oxygen showed changes in pulmonary ventilation; however, these did not modify the condition of the compensating respiratory response. Electrocardiographic tracings in this group exhibited no changes. Under the same conditions, breathing a mixture of 8.63% oxygen caused greater changes in pulmonary ventilation and a hypoxic state close to the limits of tolerance, and in 4 out of 6 cases electrocardiographic changes.

7348

Garcia, J. F.

ERYTHROPOIETIC RESPONSE TO HYPOXIA AS A FUNCTION OF AGE IN THE NORMAL MALE RAT. —Amer. Jour. Physiol. 190 (1): 25-30. July, 1957. DCL (QP1.A5, v. 190)

Rats 5-250 days of age were exposed to a hypoxic environment (9.0% oxygen) 6 hours a day for 14 days, and red cell volumes were determined by the measurement of injected ^{59}Fe . During the growing period of 5-30 days the rats showed no significant change in blood cell production under the hypoxic stimulus. Rats 50 days of age were the youngest group to show a marked increase in total blood cell volume and total hemoglobin counts. It is suggested that blood cell production in the young rats is at the maximum value and the hypoxic stimulus does not tend to increase the production.

7349

Gastaut, H.,

R. Naquet, and H. Regis

[THE COMPARATIVE EFFECTS OF ANOXIA ON THE ELECTRICAL CORTICAL ACTIVITY AND THE RETICULAR ACTIVITY] Effets comparatifs de l'anoxie sur l'activité électrique corticale et l'activité réticulaire. —Comptes rendus de la Société de biologie (Paris), 151 (12): 2141-2144. Dec. 18, 1957. DLC (QP1.S7, v. 151)

Electroencephalographic recordings were made on cats under anoxia, with injections of strychnine, and under anoxia and strychnine combined. Anoxia produces a decrease in activity starting in the cortex and then progressing into the sub-cortical structures. Strychnine given after anoxia is started provokes an hypersynchronous discharge from the bulbar reticular formation which diminishes during further anoxia. Upon reoxygenation the discharge reappears in increased amplitude and frequency only to return to normal within a few minutes.

7350

Ghinozzi, G. P.,

and G. Melneri

[BEHAVIOR OF DIURESIS IN SUBJECTS EXPOSED TO SIMULATED ALTITUDES OF 3400 METERS (BAROMETRIC PRESSURE = 493 mm Hg) AND 4500 METERS (B. P. = 433 mm Hg)] Comportamento della diuresi in soggetti sottoposti ad altezze fittizie di 3500 m (P.B. = 493 mm Hg) e di 4500 m. (P.B. = 433 mm Hg). —Rivista di medicina aeronautica (Roma), 20 (1): 76-81. Jan.-March 1957. In Italian, with English summary (p. 80). DLC (RC1050.R56, v. 20)

Eight males subjected to mild anoxic anoxia at simulated altitudes of 3,500 and 4,500 meters respectively showed an increase in diuresis with a decrease of specific gravity of the urine. Simultaneously an increase in the urinary excretion of

bases appeared, possible related to the increased pulmonary elimination of carbon dioxide.

7351

Gollan, F.,

G. G. Rudolph, and N. S. Olsen

ELECTROLYTE TRANSFER DURING HYPOTHERMIA AND ANOXIA IN DOGS. —Amer. Jour. Physiol., 189 (3): 277-280. May 1957.

DLC (QP1.A5, v. 189)

Same as item no. 5422, vol. V.

7352

Greene, N. M.,

and A. D'E. Phillips

METABOLIC RESPONSE OF DOGS TO HYPOXIA IN THE ABSENCE OF CIRCULATING EPINEPHRINE AND NOREPINEPHRINE. —Amer. Jour. Physiol. 189 (3): 475-478. June 1957. DCL (QP1.A5, v. 189)

After total sympathetic blockage and a bilateral adrenalectomy, dogs were ventilated with an atmosphere of 2.7% O_2 . Blood lactate and potassium increased significantly during hypoxia. The lactate rise was due to anaerobic carbohydrate metabolism and the increase of potassium to the loss of intracellular potassium. In intact control animals the additional increases above these levels were related to the release of epinephrine and norepinephrine. (25 references)

7353

Greene, R.

MENTAL PERFORMANCE IN CHRONIC ANOXIA.

—Bri. Med. Jour. (London), No. 5026: 1028-1030. May 4, 1957. DLC (R31.B93, No. 5026)

The mental effects of anoxia in mountain climbers are reviewed. Different people are affected by anoxia very differently, some men showing little change within the limits of the "experiment", and others being affected very much as they are by alcoholic intoxication. Memory and the capacity to perform mental work may be seriously affected. Emotional instability, usually in the form of irritability, may be severe. These emotional effects are observed in some cases after long stays at altitudes as low as 7,000 feet.

7354

Hauty, G. T.,

R. B. Payne and R. O. Bauer

EFFECTS OF NORMAL AIR AND DEXTRO-AMPHETAMINE UPON WORK DECREMENT INDUCED BY OXYGEN IMPOVERISHMENT AND FATIGUE. —Jour. Pharmacol., 119 (3): 385-389. March 1957. DLC (R51.J85, v. 119)

Sixty-four airmen were trained for 50 minutes at a compensatory pursuit task involving simulated aircraft indicators and controls. One-half of the subjects were given 5 mg. of d-amphetamine and then required to perform the task for four consecutive hours at ground level. For the first two hours of work, all the subjects breathed a nitrogen-oxygen mixture containing 12% oxygen. During the third hour they breathed the mixture but with 21% oxygen, and for the fourth hour all subjects were returned to the first mixture. In the controls (without medication) normal air completely arrested proficiency degradation induced by the combined effects of hypoxia and fatigue, and sustained proficiency at a constant level. In the d-amphetamine group, normal air did not produce further proficiency increment,

but d-amphetamine postponed the decline in proficiency which otherwise would have occurred during the breathing of 12% oxygen. (Authors' summary, modified)

7355

Husson, G.,
and A. B. Otis
ADAPTIVE VALUE OF RESPIRATORY ADJUSTMENTS TO SHUNT HYPOXIA AND TO ALTITUDE HYPOXIA.—*Jour. Clinical Investigation*, 36 (2): 270-278. Feb. 1957. DLC (R11.J67, v. 36)

Some bodily adjustments which may occur as a result of exposure to chronic hypoxia are studied. These adjustments are evaluated on the basis of their effectiveness in raising the oxygen tension of the body. Increased pulmonary ventilation is an important adaptation to altitude hypoxia. In chronic altitude hypoxia the usual acid-base balance is one of compensated respiratory alkalosis. Adaptive adjustments to shunt hypoxia are also discussed. (25 references) (Authors' summary, modified)

7356

[HYPOXIA] Hipóxia.—*Revista médica da aeronáutica* (Rio de Janeiro), 9 (1-2): 100-113. Jan.-June 1957. In Portuguese. DNLM

This is a discussion of hypoxia at altitude, describing its etiology, symptoms, physiological accommodation and acute stages, preventive measures, and the use of oxygen in aviation.

7357

Honig, C. R.,
and S. M. Tenney
DETERMINANTS OF THE CIRCULATORY RESPONSE TO HYPOXIA AND HYPERCAPNIA.—*Amer. Heart Jour.*, 53 (5): 687-698. May 1957. DLC (RC681.A1A58, v. 53)

Mechanisms responsible for circulatory changes in hypoxia and hypercapnia have been studied with an "aperiodic" ballistocardiograph, teeterboard, and ancillary techniques. The results emphasize the necessity for measuring cardiac function in evaluating the effects of drugs or autonomic discharges, for both the vasomotor center and chemoreceptors altered ventricular contractility as well as vasomotor tone. Circulatory performance in hypoxia and hypercapnia represents the resultant of direct cardiac depressant effects and opposing reflexly mediated alterations in contractility and vascular tone. (From the authors' summary)

7358

Maag, C. H.
CHARACTERISTICS OF MENTAL IMPAIRMENT IN HYPOXIA.—*Amer. Jour. Psychol.*, 70 (2): 243-247. June 1957. DLC (BF1.A5, v. 70)

An experiment was conducted to test the hypothesis that hypoxia produces an initial decline in mental efficiency, followed by a steady state which persists until the time of collapse. The steady state would be characterized by uniform performance interspersed with brief periods of inadequate performance which increase in frequency with the duration of stress, giving the appearance of a continuous decline in efficiency when performance is averaged over long temporal intervals. The performance of ten subjects on a conceptual reasoning task involving classification was measured at altitudes of 13,000-18,000 feet to the

point of collapse. Consideration of all data revealed a progressive decline in performance during hypoxia. When responses deviating by an arbitrarily-determined value from individual subjects' performance were eliminated from the data, a constant level of performance was found for the later stages of hypoxia. The number of deviations in performance was also observed to increase with duration of exposure. It is concluded that the data obtained favor the concept of an initial decline and intermittent impairment of performance in hypoxia, rather than a progressive decline.

7359

Merrill, J. M.,
J. Lemley-Stone, and G. R. Meneely
EFFECT OF ACUTE ANOXIA ON THE GLUTAMIC OXALACETIC TRANSAMINASE CONTENT OF THE MYOCARDIUM OF THE RAT.—*Amer. Jour. Physiol.*, 190 (3): 522-524. Sept. 1957. DLC (QP1.A5, v. 190)

Transaminase activity in tissues and serum was determined in a group of rats subjected to anoxia and in a control group of animals. There was a 27% decrease in the transaminase activity of the anoxic myocardial tissue without any appreciable change in serum activity. Other tissues which were studied showed that anoxia produces varying decrements in transaminase activity. *In vitro* studies of tissue taken from anoxic animals indicate that the loss of transaminase activity is not caused by loss or destruction of its coenzyme, pyridoxal phosphate. (Authors' abstract)

7360

Mourek, J.
[THE ROLE OF THE CENTRAL NERVOUS SYSTEM IN THE PROGRESS OF THE ORGANISM'S REACTION TO HYPOXIA IN ONTOGENESIS] Wpływ ośrodkowego układu nerwowego na rozwój reakcji organizmu na hipoksję w ontogenezie.—*Acta physiologica polonica* (Warszawa), 8 (3-3a): 471-472. 1957. In Polish. DLC (QP1.A27, v. 8)

Experiments on rats have shown that hypoxia of short duration, produced under conditions simulating 6000 m., induces a decrease in oxygen consumption and body temperature in animals prior to 14-16 days of postnatal life. Decortication of immature rats delayed the reaction to hypoxia, but had no effects when performed on the 20-22nd day of postnatal life.

7361

Nordström, K.
THE RETICULOCYTE REACTION IN HYPOXIA OF SHORT DURATION.—*Acta medica Scandinavica* (Helsingfors), Supplementum 326. 104+[12] p. DNLM

Hypoxic mixtures of different oxygen concentration were administered to 143 subjects. Lowering of the oxygen saturation of the blood to 82% resulted in an increase of the reticulocyte count over the control values. Lowering oxygen saturation of the blood to 93 and 85% resulted in a slight increase of reticulocyte count in half of the subjects while the others exhibited decreased values. The course of the reticulocyte reaction as seen from the variation in total figures, and as a shift in the distribution of cells in the different groups of maturity, favored the assumption of there being an adjusted accelerated speed of maturation in connection with oxygen deficiency. No definite conclusions were reached as to the ef-

fect of hypoxia of short duration on the reaction of the erythrocytes. (Results, quoted in part)

7362

Okuma, T.,

Y. Shimazoko, and H. Narabayashi
CORTICAL AND SUBCORTICAL ELECTROGRAMS
IN ANESTHESIA AND ANOXIA IN MAN.—Electro-
encephalography and Clinical Neurophysiol. (Mon-
treuil), 9 (4): 609-622. Nov. 1957. DNLM

At the time of stereoecephalotomy, electrograms of the central cortex, subcortical white matter and diencephalic nuclei were recorded together with scalp electroencephalogram. The investigations were carried out on patients with neurological disorders, those being chosen with normal or near normal EEGs. The effects of several anesthetics and hypoxia on the cortical and depth electrograms were investigated in relation to the neural mechanism underlying alteration of consciousness. Inhalation of N_2 induced an initial depression of cortical and subcortical activity followed by a period of increased voltage and duration. Cortical fast activity showed gradual slowing and enhancement with advancing hypoxia. Loss of consciousness was almost coincident with appearance of delta waves in the cortex and depth. After the recovery of consciousness the fast activity tended to remain augmented. (From the authors' summary)

7363

Padula, F.

[EFFECT OF COCARBOXYLASES, THIAMINE AND
THIOCTIC ACID ON RESISTANCE TO EXPERI-
MENTAL HYPOXIA] Azione della cocarbossilasi,
della tiamina e dell'acido tiocistico sulla resistenza
all'ipossia sperimentale.—Rivista di medicina
aeronautica (Roma), 20 (4): 632-640. Oct.-Dec.
1957. In Italian, with English summary (p. 638).

DLC (RC1050.R56, v. 20)

Rats were given intraperitoneally either cocarboxylase, thiamine, or thioctic acid and exposed to a simulated altitude of 10,000 meters in a decompression chamber supplied with continuous air flow. Cocarboxylase had a mild protective action to hypoxia, thiamine a slightly less evident action, and thioctic acid no action.

7364

[POLYGLLOBULISM CAUSED BY DISCONTINUOUS
ANOXIA] Poliglobulia da anossia discontinua.—
Rivista di medicina aeronautica (Roma), 20 (2): 269-
273. April-June 1957. In Italian.

DLC (RC1050.R56, v. 20)

A review of various studies on discontinuous anoxia reveals that it causes a blood reaction (polycythemia) similar to that produced by acute anoxia and chronic continuous anoxia. Participating in the formation of polycythemia are the spleen and bone marrow; the spleen in a small measure, and the marrow in a greater measure.

7365

Prentice, T. C.,

and E. A. Mirand

EFFECT OF LOW OXYGEN DURATION AND LIVER
DAMAGE ON PLASMA ERYTHROPOIETIN TITER IN
HYPOXIC ANIMALS.—Exper. Med. and Surgery, 15
(2-3): 176-180. 1957. DNLM

Normal rats placed in a low oxygen atmosphere (10% oxygen) for periods ranging from 4 to 48 hours revealed definite elevation of plasma erythropoietin

(EPF) titer until 24 hours, as judged by Fe^{59} uptake assay using hypophysectomized rats. After 48 hours this level returned to normal. Previous experiments demonstrated normal levels after 5 days in a hypoxic (10% oxygen) atmosphere. Therefore, there is a prompt rise in plasma EPF under the hypoxic stimulus, returning to normal in 48 hours and remaining there up to 5 days. Severe liver damage associated with hypoxia tends to prolong the time during which EPF is elevated in hypoxic rats. Lesser degrees of liver damage do not produce similar results. (Authors' summary, modified)

7366

Rossi, N.

[MYOCARDIAL CYTOCHROME OXIDASE IN EX-
PERIMENTAL HYPOXIA] La citocromossidasi
miocardica nella ipossia sperimentale.—Acta
anaesthesiologica (Padova), 8 (3): 189-196. May-
June 1957. In Italian, with English summary (p. 195).
DNLM

Cytochrome oxidase was found to persist in the myocardium of hypoxic rats examined after death. Moreover, it appears in an unaltered so-called indophenoloxidase form.

7367

Salvini, M.,

and E. Capodaglio

[RESPIRATORY RESPONSE TO DIAGNOSTIC
EXPERIMENTAL HYPOXIA] Risposta respiratoria
all'ipossia sperimentale diagnostica.—Bollettino
della Società italiana di biologia sperimentale
(Napoli), 33 (5): 588-560. May 1957. In Italian.
DNLM

Three subjects 24-27 years of age breathed mixtures in a Douglas pouch, one containing environmental air, the other 15% oxygen in nitrogen. The time of exposure to each mixture was 7 minutes. An increase was found in alveolar ventilation, carbon dioxide production, and respiratory quotient. This led to hyperventilation, which caused lowering of the partial carbon dioxide tension, and maintenance of the oxygen partial pressure at relatively high values. This hyperventilation was not constant.

7368

Schäfer, G.

[GLUTATHIONE METABOLISM AND HYPOXIA]
Glutathionstoffwechsel und Sauerstoffmangel.—Inter-
nationale Zeitschrift für angewandte Physiologie
(Berlin), 16 (5): 389-399. 1957. In German. DNLM

The effect of hypoxia on the glutathione content of blood was, as follows: (1) A single exposure to hypoxia of 2 to 4 hours duration (simulated altitude 7500 to 8000 m.) resulted in a 15-35% increase of glutathione content. (2) Two months acclimatization to hypoxia raised the glutathione concentration by 69-90%. It is possible that increased concentration of glutathione lowers the oxygen requirement for cell metabolism. (Author's summary, modified)

7369

Shrinagesh, M. M.

HYPOXIA HELPED!—Aero Med. Soc. Jour. (New
Delhi), 4 (1): 24-25. Dec. 1957. DNLM

A case is reported of a pilot whose life was saved when he became anoxic during an exercise at 32,000 feet (oxygen was switched to "high" at 25,000 feet), mistook smoke in the cockpit for fire, disconnected his oxygen equipment, and proceeded to bail out. The hood, however, did not blow off and his head hit the

canopy. Upon regaining consciousness he was able to avert a crash by landing the aircraft with his right hand since his left had become numb (due to frostbite). This case illustrates (1) the importance of switching oxygen to "emergency" under such circumstances, (2) that oxygen should be disconnected last prior to bailout, and (3) that pilots should insure the correct and tight fit of oxygen masks and wear protective clothing such as gloves, etc.

7370

Stroud, R. C., 1957

and K. E. Schaefer

COMBINED VENTILATORY AND BREATH-HOLDING EVALUATION OF SENSITIVITY TO RESPIRATORY GASES [Abstract]. — Federation Proceedings, 16 (1, part 1): 126. March 1957.

DLC (QH301.F37, v. 16)

In terms of ventilatory response to carbon dioxide (CO_2) two distinct groups exist: the one exhibiting high, the other low sensitivity. In order to evaluate further the respiratory characteristics of these two groups, a series of parallel ventilatory and breath-holding experiments were performed. Continuous measurements of alveolar CO_2 (Beckman CO_2 meter) and minute ventilation (Spirogram) were made while each subject breathed 1.5, 3, or 5% CO_2 in O_2 , 21% O_2 , or 16% O_2 for a 15-minute period, at the end of which an alveolar gas sample was obtained for CO_2 and O_2 analysis. Each subject also undertook a series of breath-holding maneuvers after breathing 100, 75, 50, 35, 28, 21, 16, or 10% O_2 for 4 minutes. End respiratory samples were obtained at the breaking point and analyzed for CO_2 and O_2 . On the basis of these data a comparison was made between the gas tensions occurring at the breaking points and the ventilatory response to similar tensions without breath holding. Such an analysis permits an indirect estimate of the "O₂ sensitivity" of the individual subjects and thus provides an additional basis for comparison of the two groups. (Authors' abstract, modified)

7371

Sulli, E.,

and A. Lobão

[CHANGES IN THE NUMBER OF ERYTHROCYTES AND THE HEMOGLOBIN VALUE INDUCED BY THE SIMULTANEOUS ACTION OF INTERMITTENT ANOXIA, COBALT, AND SMALL BLOOD TRANSFUSIONS] Modifiche indotte sul numero dei globuli rossi e sul valore emoglobinico dall'azione contemporanea esercitata dall'anossia intermittente, dal cobalto e da piccole transfusioni di sangue. — Rivista di medicina aeronautica (Roma), 20 (2): 224-234. April-June 1957. In Italian, with English summary (p. 232). DLC (RC1050.R56, v. 20)

A marked increase in the number of erythrocytes was found in two groups of rabbits of the same sex, age, and on the same standard diet, under the simultaneous influence of intermittent anoxia, cobalt injection, and repeated small blood transfusions. The experiment lasted one month for each group. At the end of the experiment the increase in erythrocytes was 72.23% and 65.66% for groups 1 and 2, respectively. Hemoglobin also showed an increase of 45.52% and 20.22% in the two groups. At the end of 30 days, the values rose to 67.46% and 58.80%, respectively. A slight, but insignificant increase in the hematocrit values was observed. This phenomenon demonstrates the importance of cobalt and blood

transfusions as hematopoietic factors. Polikilocytosis and anisomicrocytosis were observed after each anoxia test.

7372

Sulli, E.

[EFFECT OF THE DURATION OF EXPOSURE TO ANOXIA ON THE NUMBER OF RETICULOCYTES]

Influenza del tempo di esposizione all'anossia sul numero dei reticulociti. — Rivista di medicina aeronautica (Roma), 20 (1): 71-75. Jan.-March 1957. In Italian, with English summary (p. 74-75).

DLC (RC1050.R56, v. 20)

In addition to polycythemia, prolonged anoxic anoxia in rabbits produced reticulocytosis which increased in intensity with the period of exposure to anoxia. This reticulocytosis did not appear to be dependent upon the severity of anoxia.

7373

Takács, L.

CORONARY CIRCULATION IN HYPOXIC STATES. — Acta physiologica Academiae scientiarum hungaricae (Budapest), 11 (1): 55-65. 1957. In English.

DLC (QP1.M333, v. 11)

Comparative studies were made of the coronary circulation vs. the systemic circulation in different types of hypoxia (arterial hypoxia, traumatic shock, and dehydration). Arterial hypoxia was induced in dogs by the inhalation for 30 minutes of a mixture of 8-10% oxygen in nitrogen. In arterial hypoxia, coronary blood flow increased more markedly than the minute volume, and coronary resistance was diminished to a more marked degree than systemic resistance. Correspondingly, the coronary fraction of the minute volume increased. (Author's summary, modified) (27 references)

7374

Takács, L.,

and M. T.-Szabó

THE MECHANISM OF THE METABOLIC CHANGES IN MUSCLE DURING SHOCK: A STUDY OF DEHYDRATION AND ARTERIAL HYPOXIA. — Acta physiologica Academiae scientiarum hungaricae (Budapest), 11 (1): 67-73. 1957. In English.

DLC (QP1.M333, v. 11)

In rats with arterial hypoxia induced by exposure to a 8-10% oxygen-nitrogen atmosphere, the level of adenosine triphosphate and glycogen decreased in the skeletal muscle, while the phospholytic and hydrolytic breakdown of glycogen remained unaffected.

7375

Takács, L.

THE CIRCULATION OF LIMBS IN HYPOXIC CONDITIONS. — Acta physiologica Academiae scientiarum hungaricae (Budapest), 11 (2): 189-195. 1957. In English. DLC (QP1.M333, v. 11)

Arterial hypoxia was induced in dogs by exposure for about 95 minutes to an environment of 8-10% oxygen in nitrogen and the circulation in the hind limb studied. Blood flow in the limb increased slightly and vascular resistance decreased. The limb fraction of the minute volume also decreased. These findings were compared with hind-limb circulation in ischaemic shock and in dehydration.

7376

Takács, L.

THE METABOLISM OF LIMBS IN HYPOXIC CONDITIONS. — Acta physiologica Academiae scientiarum

arum hungaricae (Budapest), 11 (2): 197-203. 1957. In English. DLC (QP1.M333, v. 11)

Also published in: Kiserlètes orvostudomány (Budapest), 9 (5-6): 468-475. Oct.-Dec. 1957. In Hungarian, with German summary (p. 475). DNLM

The metabolism of the *in situ* limb was studied in dogs in ischemic shock, dehydration, and arterial hypoxia. In hypoxia, induced by exposure of the animals for 90 minutes to an environment of 8-10% oxygen in nitrogen, the oxygen consumption decreased while the glucose uptake was unchanged. Lactic acid output was slightly elevated.

7377

Thorn, W.,

J. Heimann, B. Müldener, and G. Gercken
[A CONTRIBUTION TO THE METABOLISM OF LIVER, KIDNEY, HEART, AND SKELETAL MUSCLE IN ASPHYXIA, ANOXIA, AND DURING HYPOTHERMIA] Beitrag zum Stoffwechsel von Leber, Niere, Herz, und Skelettmuskulatur in Asphyxie, Anoxie und bei Hypothermie.—Pflügers Archiv für die gesamte Physiologie (Berlin), 265 (1): 34-54. 1957. In German. DLC (QP1.A63, v. 265)

Metabolite concentrations in heart, liver, kidney, brain, and quadriceps muscle were investigated in asphyxiated and anoxic rabbits at normal and at lowered body temperature (26° C.). Optic enzymatic tests were used to determine changes in concentrations of adenosine triphosphate (ATP), adenosine diphosphate (ADP), fructose diphosphate, dihydroxyacetone phosphate, pyruvic acid, lactic acid, inorganic phosphates, and phosphocreatine. In anaerobic conditions the metabolic activity as estimated by increase of lactic acid content was found in the heart muscle, brain, kidney, liver, and skeletal muscle, in descending order. ATP content and ATP/ADP ratio were lowest in the liver. Phosphocreatine could not be measured in liver and kidney. All reactions took place at a slower rate in animals at 26° C. body temperature. Since the organ lactic acid in hypothermic animals was never higher than in normothermic animals, the hypothesis of acidosis resulting from hypoxia during cooling is not tenable at least for cooling to 26° C.

7378

Van Fossan, D.,

1957

C. Biddulph, and D. Grisucola
POST-MORTEM BRAIN LACTIC ACID AS INFLUENCED BY HYPOXIA AND/OR HYPOCAPNIA [Abstract].—Federation Proceedings, 16 (1, part 1): 131. March 1957. DLC (QH301.F37, v. 16)

Comparison was made of the three-hour post-mortem brain lactic acid concentration of the following 5 groups of 8 dogs each: control, hyperventilated, hyperventilated plus hypoxic and two hypoxic groups. All animals were nembutalized and mechanically ventilated. Significant elevation of the post-mortem brain lactic acid was noted only when hyperventilation and hypoxia were combined. Brain samples from 88 human aircraft crash victims were analyzed for lactic acid. Eighteen samples were higher than the control values for mice, rats, rabbits, and dogs and comparable to the values for hyperventilated plus hypoxic dogs. Although the human data may not be compared unequivocally with animal data, the consistency of control values from various species suggests that those humans whose lactic acid values were above 200 mg./100 cc. were hypoxic and hyperventilating. (From the authors' abstract)

7379

Vozza, R.,

and P. Rizzo

[HISTOLOGICAL CONTRIBUTION TO THE KNOWLEDGE OF OCULAR LESIONS CAUSED BY CHRONIC ANOXIA] Contributo istologico alla conoscenza delle lesioni oculari da anossia cronica.—Rivista di medicina aeronautica (Roma), 20 (1): 44-56. Jan.-March 1957. In Italian, with English summary (p. 54). DLC (RC1050.R56, v. 20)

A histopathological study was made of the eyes of rats decompressed to a simulated altitude of 7,000 meters for a period of 30 days. Chronic anoxia caused retinal alterations ranging from increased vasodilatation, edema, serous exudation, and migration of blood elements from dilated and congested vessels. Vascular endothelial vacuolization was found which was attributed to hydropic degeneration. Also observed was pyknosis and karyolysis of ganglion cells. Staining with the McManus method failed to show any significant variation in the distribution of ocular acid mucopolysaccharides.

f. Environmental Temperature

[Body temperature under 3-e; Thermal radiation under 6-n]

7380

Adams, T.,

and D. W. Rennie

THE COMPARATIVE TOLERANCE OF NEGROES AND CAUCASIANS TO A STANDARDIZED COLD STRESS AS INDICATED BY BODY TEMPERATURE AND METABOLIC RATE.—Arctic Aeromedical Lab., Ladd Air Force Base, Alaska. Technical Report no. 57-20, Sept. 1957. iv+23 p. UNCLASSIFIED

A group of Negro and Caucasian combat infantrymen were exposed to a standardized cold stress (10° F.) in the summer and at the end of the winter in order to compare their thermoregulatory response and to determine if chronic cold exposure modified this response. A greater degree of vasodilatation, as indicated by colder skin temperatures, was observed in the fingers and the hands of the Negroes; otherwise, body temperatures were identical between the two groups of subjects throughout the cold tests. Less vasoconstriction occurred in the hands and feet following the winter's activities. This probably represents some degree of local cold acclimatization. Shivering, as indicated by metabolic rates, occurred earlier in the Caucasian subjects and was significantly greater in this group by the end of the cold test. The increased shivering stimulus of the Caucasian group may come from the increased heat flux across the thermoreceptors in the hands and fingers of these subjects. The possibility that the white subjects have a reduced shivering threshold compared to the Negro subjects cannot be ruled out. If colder fingers and hands can be correlated with decreased function, it may be concluded that the Negro is comparatively poorly adapted to cold weather operations. (From the authors' summary and conclusions)

7381

Amer. Power Jet Co.

HUMAN ENGINEERING FACTORS AFFECTED ARCTIC AIRCRAFT MAINTENANCE: DATA SOURCES AND PROJECT BIBLIOGRAPHY.—American Power Jet Co., Ridgefield, N. J. (Contract AF 41(657)-41); issued by Arctic Aeromedical Lab., Ladd Air Force

Base, Alaska (Project no. 7957-1). Technical Note no. AAL-TN-57-12, Dec. 1957. 66 p. AD 162 571

UNCLASSIFIED

This bibliography of human factors affecting Arctic maintenance consists of data assembled through a series of field investigations paralleled by a comprehensive survey of available literature. The 566 references are arranged either by author or title and cover the following general areas: (1) Arctic maintenance experience—aircraft, (2) Arctic maintenance—ground handling equipment, (3) cold weather tests and functional evaluations, (4) Arctic facilities, (5) Arctic environmental vectors affecting human performance, (6) human engineering - Arctic and general, (7) psychology and physiology of man in the cold, (8) winter training, and (9) maintenance performance and its evaluation.

7382

Barrett, W. C.,

and W. F. McNary

THE EFFECTS OF HEAT, AND ALTERNATING HEAT AND COLD EXPOSURE ON THE CONNECTIVE TISSUES, ENDOCRINES, AND OTHER ORGANS OF THE RAT.—Boston Univ. School of Medicine, Mass. (Contract no. DA19-123-QM-384; Project no. 7-64-12-004D). Final Report, [1957]. [96] p. AD 136 232

UNCLASSIFIED

This investigation of the effects of heat stress and combinations of heat and cold stress confirms and extends previous findings concerning the role of the fibroblast and macrophage as buffering agents whose reactions are important in maintaining a constant internal environment within the connective tissues. Alteration of fat cells during various degrees of temperature stress are described. These reactions are constant and predictable; and the cytology of the fat cell is a precise indicator of degree of stress, recovery from stress, and acclimatization. On the basis of adaptive cellular reactions within the connective tissue, temperature stress is related to vascular changes and metabolic and dietary factors. The frequent lack of correlation between adrenal response and degree of stress minimizes the role of adrenocortical hormones in potentiating cellular reactions. Altered metabolic function may play an important part in modifying endocrine glands, liver and kidney. (Authors' summary) (90 references)

7383

Bělehrádek, J.

PHYSIOLOGICAL ASPECTS OF HEAT AND COLD.

—Annual Rev. Physiol., 19: 59-82. 1957.

DLC (QP1.A535, v. 19)

The literature published since 1935 on the general physiological aspects of the action of temperature is reviewed. Aspects so treated include thermic properties, rate processes, the effect of low temperatures, the effect of high temperatures, and thermal adaptation. (251 references)

7384

Bligh, J.

THE INITIATION OF THERMAL POLYPNOEA IN THE CALF.—Jour. Physiol. (London), 136 (2): 413-419, April 1957. DCL (QP1.J75, v. 136)

Three calves 4-6 months of age were stationed in a climatic chamber preset at 20°C., whereupon the temperature was increased rapidly to 40°C. and held constant for 100 minutes. A total of 18 trials were made on anesthetized and unanesthetized animals. In unanesthetized animals panting began before a rise

in temperature in the bicarotid trunk. Skin temperature and rate of respiration began increasing within 5 minutes of the air temperature being raised. It is concluded that the thermal stimulus initiating panting is of a peripheral origin as is the case in other mammals.

7385

Brebbia, D. R.,

R. F. Goldman, and E. R. Buskirk

WATER VAPOR LOSS FROM THE RESPIRATORY TRACT DURING OUTDOOR EXERCISE IN THE COLD. — Jour. Applied Physiol., 11 (2): 219-222. Sept. 1957. DLC (QP1.J72, v. 11)

Three men were measured for heat loss during rest and exercise at temperatures ranging from -16° C. to -33° C. Total heat loss was 10.3 to 92.2 Cal./hr., while respiratory evaporative loss was about 9% of the total. Water vapor loss was directly proportional to the ventilation volume and averaged about 32 mg./liter of expired air, and water loss by this way could even exceed 1-1.5 liters/day when working in the cold for long periods.

7386

Burton, A. C.

RESEARCH IN APPLIED PHYSIOLOGY OF THE COLD.—Revue canadienne de biologie (Montreal), 16 (2): 293-301. June 1957. In English.

DLC (QH301.R47, v. 16)

A description is presented of "ad hoc" researches on cold conducted within the last few years on damp cold vs. dry cold, the effects of breathing oxygen in the cold, and the heat loss of the human head during cold exposure.

7387

Buskirk, E. R.,

T. E. Dee, B. E. Welch, L. M. Levy, and C. F.

Consolazio

CALORIC INTAKE ASSOCIATED WITH PROLONGED HARD WORK IN THE COLD.—Quartermaster Research and Development Center. Environmental Protection Research Div., Natick, Mass. (Project no. 7-83-01-004C). Technical Report no. EP-58, May 1957. iv+[28] p. AD 134 889 PB 128 682

Caloric intake, fluid balance, and body composition were studied in a group of 26 men during a 28-day stay at Fort Churchill, Manitoba, Canada. The first seven days were spent in a pre-bivouac situation preparing for bivouac. The remaining days were spent in the field in a moving self-sustaining bivouac. During the pre-bivouac period the caloric intake averaged 3355 Calories per man. During the bivouac the intake was increased to 4163 Calories/man/day. The latter figure may be regarded as a maximal figure for sustained (more than five days) hard work in the cold. A mean weight loss of 1.19 kg./man was observed during the bivouac. This weight loss was accompanied by a corresponding increase in body density. Water balance calculated for the bivouac indicated a negative balance of 93 g./man/day or 1.95 kg./man total. Deuterium oxide space gave essentially the same results. Nitrogen balance data indicated some retention of nitrogen during the bivouac. Although body composition changed (loss of water and fat and gain of nitrogen), this redistribution probably reflects a "beneficial" effect of the extensive work and not an inadequacy of calories. (Authors' abstract) (23 references)

7388

Buskirk, E. R.,

P. F. Iampietro, B. E. Welch, and J. G. Marcinek
CALORIC INTAKE AND ENERGY EXPENDITURE OF EIGHT MEN IN A TEMPERATE ENVIRONMENT.—Quartermaster Research and Development Center. Environmental Protection Research Div., Natick, Mass. (Project no. 7-83-01-004C). Technical Report no. EP-52, March 1957. iv+12 p. AD 128 925

PB 127 722

Caloric intake and expenditure were studied in eight men during a twelve-day period in a temperate environment at Natick, Massachusetts. Outdoor activity consisted of marching 10 to 11 miles per day. The mean ambient temperature during daylight hours was 22.2°C. (72°F.), the mean relative humidity was 68%, and the mean windspeed was 2.8 miles per hour. Caloric intake averaged 2812 Calories/man/day during the entire study. The range in the average caloric intake was from 2259 to 3454 Calories/day. Average body weight changed little during the course of the study. Daily energy expenditure (marching and other activities) during the entire study was 2899 Calories/man/day, and ranged from 2625 to 3163 Calories/day. (Authors' abstract)

7389

Carlson, L. D.,

and A. C. L. Hsieh

THE ROLE OF THE THYROID IN THE METABOLIC RESPONSE TO LOW TEMPERATURE.—Arctic Aeromedical Lab., Ladd Air Force Base, Alaska. Technical Report no. 57-1, May 1957. 12 p.

UNCLASSIFIED

The requirement for thyroxin in chemical regulation of heat production has been studied by testing the metabolic response of curarized rats to cold exposure at varying periods after thyroidectomy. Sprague-Dawley rats were kept at 5°C. and 28°C. The metabolic response to cold in curarized rats is not directly dependent upon the amount of circulating thyroxin because the response persists when thyroxin stores are depleted. Cold-adapted rats reduced their food intake and lost weight following thyroidectomy, but maintained a high metabolism at 5°C. (Authors' abstract)

7390

Chiles, W. D.

EFFECTS OF ELEVATED TEMPERATURES ON PERFORMANCE OF A COMPLEX MENTAL TASK.—Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio (Project no. 7193, Task no. 71615). WADC Technical Report no. 57-726, Dec. 1957. iv+9 p. AD 142 192

PB 131 666

Eleven subjects were tested on a complex mental task at four different effective temperatures—76, 81, 86, and 91°F. Differences among the temperature conditions were not significant. This result is in contrast to that obtained by R. D. Pepler who reported significant differences under essentially the same conditions. It is concluded that there is no effect of elevated temperatures, within the range used, on the performance of this task. (Author's abstract)

7391

Christie, R. W.

MEDICAL NOTES ON A GREENLAND ICECAP EXPEDITION.—*Jour. Amer. Med. Assoc.*, 164 (12): 1314-1317. July 20, 1957. DLC

Six men were isolated for 100 days, during which

they traveled almost 1,200 miles, in parts of Greenland where temperatures ranged from 31 to -30°F. at altitudes up to 12,000 ft. The most frequent disease of complaint was respiratory, particularly sinusitis. All members of the group showed a sudden fall of hemoglobin level and red blood cell count soon after setting out. Diarrhea, which is particularly unpleasant in polar regions, occurred in three instances. A single case of a disease resembling influenza followed three days after the receipt of some supplies by airdrop. Morale was lowest when activities and demands on individuals were least; it was improved by radio contacts with the outside world. On the basis of this experience a list of supplies for a medical emergency kit is proposed. (Author's abstract, modified)

7392

Clarke, R. S. J.,

R. F. Hellon, and A. R. Lind

COLD VASODILATATION IN THE HUMAN FOREARM [Abstract].—*Jour. Physiol. (London)*, 137 84P-85P. 1957. DLC (QPLJ75, v. 137)

The blood flow in the forearm was measured after immersion in water (2-42°C.) for 28 minutes. The flow rate decreased with decreasing temperature until 14°C. was reached; at lower temperatures it increased again, attaining its maximum at the lowest temperature.

7393

Depocas, F.,

G. K. MacLeod, and J. S. Hart

STUDIES ON GLUCOSE METABOLISM OF WARM AND COLD ACCLIMATED RATS AT -5°C.—*Revue canadienne de biologie (Montreal)*, 16 (1): 83-95. April 1957. In English. DLC (QH301.R47, v. 16)

Intraperitoneal injection of uniformly C¹⁴-labeled glucose (U-C¹⁴-glucose) into 6°C. and 30°C. acclimated rats at -5°C. resulted in a respiratory C¹⁴O₂ production pattern which was dependent on the acclimation temperature of the animals. At the beginning of the experiment, cold-acclimated rats exhaled a larger proportion of injected C¹⁴ while after 30 minutes warm-acclimated rats increased C¹⁴O₂ output above that of 6°C. rats. These observations were not related to the rate of disappearance of intraperitoneally injected glucose as determined by direct measurements, and to the observation that intravenously injected U-C¹⁴-glucose leads to a similar respiratory C¹⁴O₂ pattern. No significant differences were found in blood glucose or muscle and liver glycogen contents. Fractionation of carcasses of warm- and cold-acclimated rats two hours after intraperitoneal administration of U-C¹⁴-glucose indicated that fatty acids did not incorporate significantly different amounts of C¹⁴. (Authors' summary, modified)

7394

Desmarais, A.

[ASCORBIC ACID IN COLD ACCLIMATIZATION] L'acide ascorbique dans l'acclimatation au froid.—*Revue canadienne de biologie (Montreal)*, 16 (2): 189-248. June 1957. In French. DLC (QH301.R47, v. 16)

A literature survey is presented including studies relating to the need of ascorbic acid for cold acclimatization and those relating to the mode of action of ascorbic acid during cold exposure. Only those

works are included which permit a critical and precise evaluation of the author's own observations. The beneficial action of ascorbic acid in cold acclimatization is described and discussed as it relates to the functions of the adrenal and thyroid glands. (80 references)

7395

Dugal, L. P.,
and G. Fortier
EFFECT OF COLD ENVIRONMENT AND ASCORBIC ACID ON THE RESPIRATORY QUOTIENT OF THE MONKEY (*MACACUS RHESUS*).—*Canad. Jour. Biochem. and Physiol. (Ottawa)*, 35 (2): 169-172. Feb. 1957. DLC (R11.C37, v. 35)

Long exposure to mild cold (6 months at 10° C.) or short exposure to intense cold (2 hours at -20° C.) significantly lowers the respiratory quotient (R.Q.) of monkeys suggesting that fat is used for extra heat production in the cold. Pre-exposure for 6 months to mild cold does not seem to affect the drop in R.Q. due to intense cold. Overdosage with ascorbic acid, in all conditions used, does not modify the R.Q. (Authors' abstract, modified)

7396

Dusek, E. R.
MANUAL PERFORMANCE AND FINGER TEMPERATURE AS A FUNCTION OF AMBIENT TEMPERATURE.—Quartermaster Research and Development Center. Environmental Protection Div., Natick, Mass. Technical Report EP-68, Oct. 1957. iv+8 p. AD 148 222 PB 133 237

Manual dexterity and finger skin temperatures were studied as a function of ambient temperature conditions. The results indicate that lowering ambient temperature (1) reduces fine finger dexterity more than gross hand dexterity; (2) increases variability and decreases level of manual performance; and (3) decreases finger skin temperatures. However, no significant correlations were found between finger skin temperatures and manual performance. (Author's abstract)

7397

Edholm, O. G.,
R. H. Fox, H. E. Lewis, and R. K. Macpherson
COLD INJURY [Abstract].—*Jour. Physiol. (London)*, 139 (3): 14P-15P. Dec. 1957. DLC (QP1.J75, v. 139)

Following immersion of the forearm in water from -1° C. to +16° C. for periods of 40-60 minutes various subjects showed redness, tenderness, and swelling of the forearm. These symptoms lasted for 2-7 days, and the injury appeared to be distinct from frostbite, immersion foot, or chilblains.

7398

Fradà, G.,
and L. Salamone
[BLOOD COAGULATION MODIFICATIONS FROM EXPOSURE TO ENVIRONMENTAL HYPERTHERMIA] Modificazioni emocoagulatorie da esposizione ad ipertermia ambientale.—*Bollettino della Società italiana di biologia sperimentale (Napoli)*, 33 (8-9): 1287-1290. Aug.-Sept. 1957. In Italian. DNLM

Ten persons between 18 and 60 years of age exposed to a hot environment of 43-45° C. for 30 minutes to 2 hours, exhibited hypercoagulability. Included is a tabulation of the average percentages of the variations in coagulation.

7399

Froese, G.,
and A. C. Burton
EFFECT OF BREATHING O₂ ON O₂ CONSUMPTION DURING EXPOSURE TO COLD [Abstract].—*Federation Proceedings*, 16 (1, part 1): 42. March 1957. DLC (QH301.F37, v. 16)

The results of four measurements on each of ten subjects, dressed and at normal room temperature (25° C.), showed no significant difference between breathing air or oxygen ($P > 0.6$). During the next experiments the room temperature was about 10° C. Two determinations of the O₂ consumptions were made while the subject was covered with blankets and four more after the nude subject had been exposed to the room temperature for 20 minutes. The average decrease in O₂ consumption when breathing O₂ was 19.7 cc./min./sq. m. which was significantly different from zero ($P < 0.001$). The increase in O₂ consumption in response to exposure to cold was reduced by 1/3 when breathing O₂. (From the authors' abstract)

7400

Gaultier, M.
[WORK IN HEAT AND IN COLD] Travail à la chaleur et au froid.—In: H. Desoille, *Cours de médecine du travail*, 2nd ed., vol. 2, p. 117-127. Paris, 1957. In French. DNLM (WA400.D467c, v. 2)

A suitable environmental temperature, relative humidity, and air supply are necessary for the proper biological balance of the worker and performance of his work. Dehydration and salt depletion are responsible for disorders caused by a hot environment. These may be prevented or controlled by a suitable diet fortified with salt and water. Nervous disorders caused by salt loss are muscular cramps, cerebral excitation, and circulatory disorders due to peripheral vasodilatation leading to cardiac collapse. When the body's internal heat-regulatory mechanism collapses, heat stroke and heat exhaustion follow. Experiments with animals exposed to cold reveal homeostatic changes, increased calorie production, acceleration of respiratory and cardiac rhythm, cutaneous vasoconstriction, and loss of weight.

7401

Grad, B.,
and V. A. Kral
RESPONSE OF YOUNG AND OLD MICE TO COLD [Abstract].—*Federation Proceedings*, 16 (1, part 1): 49. March 1957. DLC (QH301.F37, v. 16)

Old female mice (16-22 months) showed a significantly higher mortality rate on exposure to cold than mature young females (4-9 months). The largest difference in mortality was observed at 6° to 7° C., although very highly significant differences were also observed at 9° to 11° C. Temperatures which killed 100% of unadapted old mice within 24 hours killed none of the old mice within this limit when they were taken to this temperature gradually, an indication that old mice can adapt to the cold. Two-thirds of adapted old mice died after a week at a temperature which failed to kill any adapted young mice. Therefore, adaptation to cold is less effective in the old. Exposure to a "cold room" temperature of 9°-11° C. resulted in a significantly greater increase in the oxygen consumption, food intake, and blood sugar in the young than in the old; body weight decreased significantly less in the young. Blood lymphocyte counts decreased reliably more in the young than

in the old and the erythrocyte count increased significantly more in the young. Significant differences due to age in the eosinopenic, neutrophilic, or liver glycogenolytic response to cold could not be detected. (Authors' abstract)

7402

Gwoździ, B.

[THE EFFECT OF HIGH TEMPERATURE ON THE HUMAN ORGANISM: THE EFFECT OF HUMID HEAT ON THE OXYGEN CONTENT AND CARBON DIOXIDE IN THE PERIPHERAL VENOUS BLOOD OF MAN AT REST] Wpływ wysokiej temperatury otoczenia na ustroj człowieka: wpływ przebywania w wilgotny gorącu w spoczynku na zawartość tlenu: dwutlenku węgla w obwodowej krwi żyłnej człowieka. — *Acta physiologica polonica* (Warszawa), 8 (2): 229-285. 1957. In Polish, with German summary (p. 234-235). DNLN

Oxygen and carbon dioxide content of the blood was measured in 59 men who had been exposed occupationally to high temperature (50° C. and 50% relative humidity) for 2 hours. There was an increase of oxygen content and a decrease of CO₂ in the blood. Increased velocity of the blood flow through extremities is assumed to be the responsible factor. The blood flow velocity is increased fourfold. (From the author's summary)

7403

Hammel, H. T.,

K. L. Andersen, Y. Løjning, and P. F. Scholander
METABOLIC ACCLIMATION TO COLD IN MAN
[Abstract]. — *Acta physiologica scandinavica* (Stockholm), 42, Supplementum 145: 63. 1957. In English. DNLN

Eight subjects lived in mountains in summer clothing and insufficient night shelter for six weeks. Climatic conditions encompassed snow and sleet with night temperatures between 0° and +5° C. Daily occupation consisted of hiking, fishing, and hunting. Acclimation was evident at the end of six weeks by the increased heat production (50-60% above the basal) during sleep, and by frequent shivering in the sleep. Control subjects under the same conditions were unable to sleep because of chilling and had less elevated metabolic rates.

7404

Hammel, H. T.,

and J. D. Hardy

SHIVERING ONLY VARIABLE SOURCE OF HEAT IN
INTACT UNACCLIMATIZED DOGS UPON EXPOSURE TO COLD [Abstract]. — *Federation Proceedings*, 16 (1, part I): 54. March 1957.

DLC (QH301.F37, v. 16)

Direct and indirect calorimetric studies were made on three intact unacclimatized dogs while exposed to temperatures between 8° and 18° C. for 5 hours. Twenty-two examples were observed in ten 5-hour runs during which time the dogs ceased shivering and their metabolic rate (oxygen consumption) returned to the resting level. Periods at the resting level ranged from 1-15 minutes, the average duration being 2-5 minutes. Periods of cessation of shivering were found to occur at any time during the run. When shivering stopped, the metabolic rate returned to the resting level; therefore it appears that the only additional heat produced by the unacclimatized dog in response to a cold environment is produced by muscular activity. (From the authors' abstract)

7405

Hardenbergh, E.,

and P. G. Bamberg

VENOUS BLOOD FLOW IN THE DOG LEG FOLLOWING COLD INJURY. — *Amer. Jour. Physiol.*, 188 (3): 461-469. March 1957.

DLC (QP1.A5, v. 188)

Measurements were made of the outflow of venous blood in frozen or nearly frozen legs of dogs. The leg was immersed in a solid CO₂-alcohol bath for 30 minutes. Temperatures in the leg dropped immediately, but the blood flow did not decrease until 5 minutes after immersion. If the temperature remained above 0° C., outflow was nearly that of the controls. In frozen legs the flow rate was 20-25% of normal. The wide variation in outflow rates (400%) is attributed to uncontrolled variables. (27 references)

7406

Hart, J. S.

CLIMATIC AND TEMPERATURE INDUCED
CHANGES IN THE ENERGETICS OF HOMEOTHERMS. — *Revue canadienne de biologie* (Montreal), 16 (2): 133-174. June 1957. In English.

DLC (QH301.R47, v. 16)

The physiological response of animals conditioned in the laboratory by cold to high rates of energy exchange has been to intensify the metabolic response to cold and to extend low temperature limits by development of a greater capability to produce and to maintain high rates of heat production. Linked with this metabolic adjustment to cold is a reduction of body insulation which results from greater peripheral circulation and heat flow. The development of processes which tend to increase the wastage of metabolic heat in animals and in humans exposed to cold conditions for several weeks tends to be suppressed in animals exposed for longer periods to natural weather conditions. Physiological adjustments to natural climatic conditions are more varied than acclimation because of the greater diversity in environmental experience. The effects depend on the length of exposure to the climates in question, on the season, and on early developmental history. (Author's conclusions, modified) (127 references)

7407

Hellman, K.,

and K. J. Collins

THYROID, SALIVARY AND HARDERIAN GLANDS IN
MICE EXPOSED TO HEAT. — *Jour. Endocrinol.* (London), 15 (2): 145-150. June 1957. DNLN

A reduction in the uptake of I¹³¹ by the thyroid gland was measured in mice reared in a hot environment (91° F. dry bulb, 85° F. wet bulb). Rapid concentration of I¹³¹ occurred in the submaxillary glands following its intraperitoneal injection. Two and three-quarter hours after injection the submaxillary glands from heat-exposed mice had a higher I¹³¹ content than those from the control counterparts. The inverse relationship between uptake of I¹³¹ by thyroid and salivary glands in heat-exposed and control mice is probably due to partition of the injected iodide between the tissues. A significant decrease in the weight of the Harderian glands, allowing for small decreases in body weight, was found in mice reared in the hot environment. (Authors' summary)

7408

Heroux, O.

1957

EFFECT OF COLD ACCLIMATION ON THICKNESS AND MITOTIC INDEX OF EPIDERMIS [Abstract].—Federation Proceedings, 16 (1, part 1): 58, March 1957. DLC (QH301.F37, v. 16)

Histological sections revealed that, after a 4-week continuous exposure to +6° C., the Malpighian layer of the epidermis in white rats was twice as thick as before acclimation in the ear and in the tail but not in the plantar region or in skin regions well covered by fur such as those on the back or the belly. Such thickening of the epidermis, at least in the ear, was not found in white rats cold-acclimated either individually by intermittent exposure to 30° and 6° C. or collectively by maintaining 10 of them together in a large cage kept outside during the winter, nor in wild Norway rats captured during the winter. In rats continually kept at +6° C. for 4 weeks, the surface temperature of the skin measured at 6° C. over the plantar region, the tail and the back was observed to be respectively: 18°, 16°, and 33° C. in comparison to 33°, 33°, and 36° C. in 30° C.-rats measured at +30° C. A study of the mitotic index done on the same rats also revealed twice as many cells in division in the ear and the plantar region after as before acclimation. (From the author's abstract)

7409

Horita, A.,

1957

and M. E. Denison

CONJUGATION OF m-AMINOPHENOL BY TISSUE SLICES FROM COLD-EXPOSED RATS [Abstract].—Federation Proceedings, 16 (1, part 1): 61, March 1957. DLC (QH301.F37, v. 16)

A greater susceptibility of male rats to cold exposure over that of female rats as determined by survival has been previously demonstrated. It seems probable that this sex differential is due to a detrimental effect of androgen and is specifically due to formation of a compound which is toxic to the animal. Conjugation is a known mechanism of detoxication of compounds containing free -OH groups, therefore the conjugating capacity of tissue slices from cold-exposed rats was investigated. m-Aminophenol was used as the substrate, and the amount of conjugated m-aminophenol was determined spectrophotometrically after one hour of incubation of liver and kidney slices in a modified Krebs-Ringer bicarbonate buffer. The conjugating capacity of tissue from intact and castrated male and female rats kept at room temperature and exposed to cold was determined. Liver tissue from male rats exposed to cold for 15 days had increased its conjugating capacity approximately 100%, whereas the amount of m-aminophenol conjugated by tissue from female rats after the same period of cold exposure was no different from that formed by tissue from control animals. (Authors' abstract)

7410

Hubač, M.,

and L. Ulrich

[WATER AND CHLORIDE METABOLISM IN MINERS WORKING IN HOT MINES. III. CHANGES IN SOME HEMATOLOGICAL VALUES DURING WORK IN HEAT] Výmena vody a chloridov u baníkov pracujúcich v horúcich prevádzkach.—Bratislavské lekár-

ske listy (Bratislava), 37 (part 2, no. 1): 29-39.

In Slovak, with English summary (p. 38).

DNLM

Changes in plasma chloride, packed cell volume (PCV) and mean corpuscular volume (MCV) values, and plasma specific gravity were measured in 17 subjects during work in a hot and humid mine. The plasma chloride level changed independently of the osmotic balance while on shift and during time off over a period of several days. Therefore the authors assume a possibility of depot storing of Cl in an inactive form during high chloride intake. At higher losses of Cl, these depots are emptied and thus the plasma chloride level does not reflect the true state. Insufficient water intake led to thickening of the blood manifested by an increase of specific gravity of the plasma. The changes in PCV values were dependent chiefly on changes in MCV and not plasma water content. No correlations could be established between individual hematocrit values. (From the authors' summary)

7411

HUMAN ENGINEERING FACTORS AFFECTING ARCTIC AIRCRAFT MAINTENANCE: DATA SOURCES AND PROJECT BIBLIOGRAPHY.—American Power Jet Co., Ridgefield, N. J. (Contract no. AF41(657)-41); issued by Arctic Aeromedical Lab., Ladd Air Force Base, Alaska (Project no. 7957-1). Technical Note AAL-TN-57-12, Dec. 1957. 66 p. AD 162 571 UNCLASSIFIED

This bibliography includes 566 items, consisting primarily of government reports. No attempt is made to duplicate listings available in other standard sources. References cover the following general areas: arctic maintenance experience of aircraft and ground handling equipment; cold weather tests and functional evaluations; arctic facilities; arctic environmental vectors affecting human performance; human engineering, arctic and general; the psychology and physiology of man in the cold; winter training; and maintenance performance and its evaluation.

7412

Iampietro, P. F.,

D. E. Bass, and E. R. Buskirk

CALORIC INTAKE DURING PROLONGED COLD EXPOSURE.—Quartermaster Research and Engineering Center. Environmental Protection Research Division, Natick, Mass. (Project no. 7-83-01-005B). Technical Report no. EP-66, Sept. 1957. iv+8 p. AD 146 288 UNCLASSIFIED

The effects of continuous cold stress (living in a chamber at 60° F. for 14 days) on caloric intake and energy expenditure of five nude, sedentary men were investigated. The cold period was preceded and followed by two weeks at 80° F. It was found that the daily food intake at 60° F. was approximately 22% greater than at 80° F. These results indicate that when men are continuously chilled they require more food because of the increased energy expenditure due to shivering. There was no evidence that cold stress imposed additional caloric requirements apart from those resulting from increased muscle activity.

7413

Iampietro, P. F.,

D. E. Bass, and E. R. Buskirk

DIURNAL OXYGEN CONSUMPTION AND RECTAL TEMPERATURE OF MAN DURING CONTINUOUS COLD EXPOSURE.—Jour. Applied Physiol., 10 (3): 398-400, May 1957. DLC (QP1.J72, v. 10)

Five men lived continuously in a chamber at 60° F.

for 14 days, wearing only shorts and doing a minimum of physical activity. The cool period was both preceded and followed by periods of 2 weeks at 80° F. Four measurements were taken daily. Resting oxygen consumption in the cold showed gradual increases from 8 a.m. to 8 p.m. as in the warm periods, but was at a level 11-20% higher. Basal metabolism did not change throughout the experiments. Rectal temperatures remained the same in the cold or warm periods except at 8 a.m. when the rectal temperature in the cold was significantly higher than at 80° F. The results indicate that rectal temperature was well maintained during cold exposure, and oxygen consumption appeared to respond in such a fashion as to subserve this maintenance. (Authors' abstract, modified)

7414

Intoccia, A.,
and L. Van Middlesworth
THYROXINE EXCRETION INCREASE BY COLD EX-
POSURE [Abstract].—Physiologist, 1 (1): 44. Nov.
1957. DNLN

Twenty-four hours after I¹³¹ thyroxin injection, rats exposed to 12°C. excreted seven times more fecal I¹³¹ than controls (31% of dose vs. 4%). The differences were less pronounced during succeeding days, as the I¹³¹ pools were depleted. Food consumption of the cold-exposed rats was double that of controls, their fecal mass was proportionately greater. Cold-exposed rats increased their dietary intake, thyroid weight, and thyroxin requirement. These data suggest that the increased thyroxin requirement of cold-exposed rats may be due partly to an increase in thyroxin loss via the feces. (Authors' abstract, modified)

7415

Jasper, R. L.,
and H. M. Levy
HORMONAL CONTROL OF FAT INFILTRATION
INTO LIVERS OF COLD-EXPOSED RATS [Abstract].
Federation Proceedings, 16 (1, part I): 87. March
1957. DLC (QH301.F37, v. 16)

Female rats exposed to cold (1-4° C.) accumulate fat in the liver at a rapid rate. Liver fat increases 80-90% above the control value after six hours' cold exposure. This response to cold is not prevented by adrenergic blocking agents. Adrenal demedullation likewise fails to eliminate fatty infiltration of the livers of animals exposed to cold. Bilateral adrenalectomy, however, does effect cold-induced fatty livers. Replacement of adrenocortical hormones does not fully restore the liver fat response of adrenalectomized animals to that of intact female rats when both are exposed to cold. Hypophysectomy of rats eliminates the accumulation of fat in the livers of intact animals exposed to cold. Relatively pure preparations of ACTH do not restore the response of cold-induced fatty livers found in intact animals. Hypophysectomized-adrenalectomized animals respond to cold exposure in much the same manner as animals either hypophysectomized or adrenalectomized. The data indicate an integrated relationship of the pituitary and adrenals. (From the authors' abstract)

7416

Johnson, H. D.
C. S. Cheng, and S. Brody
EFFECT OF RISING ENVIRONMENTAL TEMPER-

1957

ATURE ON THE THYROID I¹³¹ ACTIVITY [Ab-
stract]. — Federation Proceedings, 16 (1, part
I): 68. March 1957. DLC (QH301.F37, v. 16)

Rising environmental temperature (48° to 110°F.) depressed the *in vivo* release rate of hormone I¹³¹ from the thyroid gland of rabbits. Associated with declines in thyroid activity were decreases in feed consumption and heat production and rise in rectal temperature at 80° F. Ratio of feed/thyroid remained somewhat constant from 48° to 105° indicating similar relative changes. These data point to a close relationship of feed consumption and thyroid activity and an inverse relationship of these functions to body temperature—even indicating that possibly the feed consumption level (via appetite center) at these higher environmental temperatures may control the thyroid activity. (From the authors' abstract)

7417

Johnston, D. R.,
T. R. A. Davis, and F. C. Bell
EFFECT OF COLD ACCLIMATIZATION ON SHIVER-
ING AND NON-SHIVERING THERMOGENESIS [Ab-
stract].—Physiologist, 1 (1): 46-47. Nov. 1957.

DNLN

Shivering activity decreased and disappeared completely at 15 days in Sprague Dawley rats and in 25 days in Wistar survivors during acclimatization to cold. The effect of muscle curarization upon total oxygen consumption gradually diminished until forty days when little effect, if any, could be demonstrated. The combination of curare and diathermy showed that, as the duration of cold exposure increased, an unknown third fraction occurred which eventually fully replaced the thermogenic fraction of shivering in every respect in that it was regulated by the effect of cold on skin receptors. (Authors' abstract, modified)

7418

Kandror, I. S.,
K. A. Rapoport, and E. I. Soltyskii
[THERMOREGULATORY CHANGES IN THE HUMAN
ORGANISM IN A COLD CLIMATE, AND THE MOR-
BIDITY CONNECTED WITH THE COOLING FAC-
TOR] Termoregulatornye sdvigi v organizme
cheloveka v kholodnom klimate i zaboлеваemost',
sviazannaya s faktorom okhlazhdeniya. — Voenno-
meditsinskii zhurnal (Moskva), 1957 (1): 61-67.
Jan. 1957. In Russian. DLC (RC970.V55, v. 1957)

Observations conducted in Arctic regions during 3 years on settlers from moderate climatic zones showed a 4-5% increase in basal metabolic rate. School children had a 17% increase, and these changes were completed within one year. Seasonal changes were minimal, and were most pronounced in outdoor workers during the winter months. Also an attempt was made to study the incidence of such diseases as lumbago, bronchitis, neuralgia, etc. If one takes the mean incidence of such diseases in people living more than 10 years in the Arctic as 100, the corresponding indices for more recent residents were: 6-10 years, 114; 3-6 years, 168; 1-3 years, 425; less than 1 year, 1060. Life in the Arctic decreases the incidence of cardiac diseases and the possibility of acclimatization could induce favorable physiological changes in the organism.

7419

Kandror, I. S.,
and K. A. Rapoport
[RESPIRATORY EXCHANGE IN MAN DURING

1957

MUSCULAR EXERCISE IN SEVERE COLD]

Gasooobmen u cheloveka pri myshechnoi rabote v usloviakh rezkogo okhlazhdeniia. — *Fiziologicheskii zhurnal SSSR* (Moskva), 43 (1): 60-64. Jan. 1957. In Russian, with English summary (p. 64).

DLC (QP1.F57, v. 43)

English translation in: *Sechenov Physiol. Jour. USSR* (Pergamon Press, New York), 43 (1): 53-57. 1957.

DLC (QP1.F573, v. 43)

Pulmonary ventilation and oxygen consumption were investigated in 6 men performing standard exercises in extremely cold weather outdoors, and indoors. It was shown that the muscular exercise does not interfere with chemical thermoregulation processes when the exercises are made in extreme cold conditions not compensated by special clothing. The temperature regulation during exercise depends on the severity of cold, the intensity of exercise, and the heat production. Individual characteristics, particularly body surface and weight, play also an important role. (Authors' abstract, modified)

7420

Kanter, G. S.

HYPOGLYCEMIC EFFECT OF HIGH ENVIRONMENTAL TEMPERATURE ON DOGS. — *Amer. Jour. Physiol.*, 188 (3): 443-446. March 1957.

DLC (QP1.A5, v. 188)

Two groups of dogs were placed in a temperature of 120° F. at a relative humidity of 20% or below for 4 hours, and levels of blood glucose were determined. A third group was exposed twice; once for 3 hours at 120° F. and the second time, after a 2-hour cooling period, for another 3 hours. Blood glucose decreased 16-22% in dogs of the first two groups, even with a corresponding dehydration of 6% of the body weight; controls had a drop of only 4%. The dogs re-exposed after a cooling period still showed a fall in glucose despite a more severe dehydration. The drop in glucose noted in these experiments is evidently metabolic as no signs of glycosuria were found.

7421

Keatinge, W. R.

THE EFFECT OF GENERAL CHILLING ON THE VASODILATOR RESPONSE TO COLD. — *Jour. Physiol. (London)*, 139 (3): 497-507. Dec. 1957.

DLC (QP1.J75, v. 139)

Seven men underwent immersion of the index finger in ice water under certain conditions, namely (1) after chilling, (2) after body heating, (3) after total immersion in a cold bath, and (4) after total immersion and blockage of the digital nerves. Rate of heat loss was greatest in the heated subjects, while the lowest rate was found in chilled subjects. Here vasodilatation was generally rapid, but in some it was slow. Adrenaline was injected into some of the subjects but had little effect on the vasoconstrictor reflexes after the subjects were really cold.

7422

Knigge, K. M.

EVIDENCE OF CENTRAL NERVOUS SYSTEM INFLUENCE UPON THE COLD-INDUCED ACCELERATION OF THYROIDAL I^{131} RELEASE IN THE HAMSTER [Abstract]. — *Physiologist*, 1 (1): 50-51. Nov. 1957. DNLM

During the initial 12 hours of cold exposure (5° C.)

of the hamster, thyroidal I^{131} release was accelerated markedly. Bilateral nephrectomy, adrenal demedullation, or adrenalectomy did not influence this response. Appropriate bilateral median eminence lesions placed 24 hours before cold exposure did not interfere with subsequent normal thyroidal release but did block the accelerated release attendant upon cold exposure. Hypophysectomized hamsters exhibited a mean I^{131} uptake of 0.71% compared to value of 3.86% in controls. In 11 of 14 hypophysectomized hamsters, autotransplantation of one or two pituitary glands into the cheek pouch significantly increased I^{131} uptake from a mean control value of 0.64% to 2.03% when tested 5-15 days later. Thyroidal I^{131} release in animals with cheek pouch grafts was not accelerated by cold exposure. These experiments indicate that the cold-induced acceleration of thyroidal I^{131} release, depending upon increased secretion of thyroid-stimulating hormone, requires the pituitary gland with its normal anatomical connections to the central nervous system. (From the author's abstract)

7423

Koiranskii, B. B.

[ON ACCLIMATIZATION PROBLEMS] K probleme akklimatizatsii. — *Gigiena truda i professional'nye zabolevania* (Moskva), 1 (2): 6-12. March-April 1957. In Russian. DNLM

Processes of adaptation to various climatic conditions can be divided into three phases: initial or transitory, change from initial to permanent, and permanent adaptation. The latter type of adaptation requires several years. Working and resting subjects exposed to a temperature of 40° C. at 25% humidity and a wind velocity of 0.2-0.3 m./second adapted themselves without discomfort. Infrared irradiation of a skin area for 30 minutes daily during a three-month period caused lowering of the skin temperature, an increase in perspiration, but did not produce erythema nor a decrease in central nervous system reactions. Exposure to 40° first increases oxygen consumption which, however, later (after 20 days) decreases. Adaptation starts after 6-7 weeks of training.

7424

Kolder, H.

[THE BEHAVIOR OF BODY TEMPERATURE AND DURATION OF SLEEP AT DIFFERENT ROOM TEMPERATURES] Verhalten von Körpertemperatur und Schlafdauer bei verschiedener Raumtemperatur. — *Zeitschrift für Biologie (München)*, 109 (3): 185-191. 1957. In German, with English summary (p. 190). DNLM

Variations of temperature during sleep were registered in a 14-week experiment in which the experimenter is also the subject. At an environmental temperature of 37° C., the usual nocturnal decrease in the body temperature is missing. The normal fall in body temperature during sleep can be reestablished by previous fluid consumption. At an environmental temperature of 37° C. the duration of sleep is shortened without previous fluid intake. (Author's summary, modified)

7425

Kreider, M. B.,

and E. R. Buskirk

SUPPLEMENTAL FEEDING AND THERMAL COMFORT DURING SLEEP IN THE COLD. — *Jour. Applied Physiol.*, 11 (3): 339-343. Nov. 1957.

DLC (QP1.J72, v. 11)

Six men were studied while sleeping in arctic sleeping bags at -34.5°C . over a period of 12 days. After the conventional meals a supplement (40% fat, 40% carbohydrate, and 20% protein) was given 10 minutes before retirement. Either 600 Cal., 1200 Cal., or none was given. With either supplement rectal temperature, toe temperature, and oxygen consumption were significantly higher than with no supplement. The supplement also reduced the times of wakefulness and discomfort due to the cold.

7426

Kundt, H. W.,

K. Brück, and H. Hensel

[HYPOTHALAMUS TEMPERATURE AND SKIN CIRCULATION IN THE UNANESTHETIZED CAT]

Hypothalamustemperatur und Hautdurchblutung der nichtnarkotisierten Katze.—Pflügers Archiv für die gesamte Physiologie (Berlin), 264 (2): 97-106. 1957. In German. DLC (QP1.A63, v. 264)

Continuous measurements were made of the hypothalamus temperature by means of thermocouples, the skin circulation in the ear, and the rectal temperature. The results were as follows: (1) At $22-23^{\circ}\text{C}$. room temperature the skin circulation exhibits rhythmic variations at a frequency of 1-2/min., followed by changes in the hypothalamus temperature up to 0.2°C ., i.e., a rise after a vasoconstrictor phase and a fall after a vasodilator phase. (2) Cold or heat stimuli applied to the extremities are followed by reflex vasoconstriction and/or dilatation and only then by a change in the hypothalamic temperature up to 0.4°C .—a rise after a cold stimulus and a fall after a heat stimulus. Changes in the rectal temperature agreed in extent and direction with those of the hypothalamic temperature but were separated by a considerable temporal delay.

7427

Ladell, W. S. S.

DISORDERS DUE TO HEAT.—Trans. Royal Soc. Tropical Med. and Hygiene (London), 51 (3): 189-207; discussion, p. 207-216. March 1957. DNLN

Men exposed to a hot climate rapidly become acclimatized; the majority remain well adapted and healthy, but some may become affected by one or more of the heat disorders. These disorders are: (1) skin disorders (sunburn, prickly heat); (2) circulatory disorders (heat syncope); (3) disorders of water and electrolyte metabolism (heat exhaustion, heat cramps); and (4) failures of heat regulation (tropical anhydrotic asthenia, hyperpyrexia). A comprehensive review of the physiological mechanisms underlying these conditions is presented.

7428

LeBlanc, J. A.,

and F. J. Rosenberg

LOCAL AND SYSTEMIC ADAPTATION TO TOPICAL COLD EXPOSURE.—Jour. Applied Physiol., 11 (3): 344-348. Nov. 1957. DLC (QP1.J72, v. 11)

Eight consecutive exposures of the hand in five men to a cold water bath (3°C .) for 7 minutes failed to show alterations in the increased systolic pressure observed with this test. However, the fall in blood pressure below the pretest value, observed on withdrawal of the hand from the cold bath, gradually disappeared. This adaptation after eight exposures of the left hand is attributed to systemic changes, since the effect persisted when on the ninth exposure the right hand was used in-

stead of the left. When in four men the circulation to the exposed hand was occluded, the fall in pressure from the cold-induced elevation was delayed. It is therefore postulated that the exposure hand liberates a substance that contributes to the fall in pressure. The evidence of other workers suggests this is a histamine-like substance. Adaptation, then, would consist of an antagonism to the histamine-like substance. A local adaptation has also been observed consisting of a decrease in the time required for the first appearance of the cold-induced vasodilatation in the exposed hand, as measured by temperature changes. (Authors' abstract)

7429

LeBlanc, J. [A.],

and F. Rosenberg

MAST CELL CHANGES IN ANIMALS EXPOSED TO COLD [Abstract].—Physiologist, 1 (1): 53-54. Nov. 1957. DNLN

The frequency of occurrence of mast cells in different tissues of rats was investigated at 2° and 6°C . In the mesentery the number of these cells increased in the perivascular region after exposing the animals for two and four weeks; in the intervascular region the number decreased after two weeks but returned to the initial value after four weeks. In the skin of the abdomen an increase was observed after two weeks. In the skin of the ear, which is more exposed to the environmental temperature than the abdomen, a significant drop was observed after two- and four-week exposures; however, the decrease was significantly larger at 2°C . than at 6°C . The changes in the number of mast cells in abdominal skin and the mesentery are considered to be systemic effects of cold; the decreases in the skin of the ear, local effects. (From the authors' abstract)

7430

LeBlanc, J. [A.]

PREFEEDING OF HIGH FAT DIET AND RESISTANCE OF RATS TO INTENSE COLD.—Canad. Jour. Biochem. and Physiol. (Ottawa), 35 (1): 25-30. Jan. 1957. DLC (R11.C37, v. 35)

Three groups of 16 albino rats were fed for 45 days, group I, a normal diet of pellets containing 3.5% fat; group II, a diet containing 17% fat in the form of oil; and group III, a diet containing 17% fat in the form of lard. On exposure to cold, the drop of rectal temperature in group I was faster and more pronounced than in group II or group III. It was shown that the larger amount of fat accumulated in the animals fed a high fat diet could not explain, either as a source of energy reserves or as an insulator, the superiority of these diets in maintaining the rectal temperatures at higher levels in the cold. It is postulated that prefeeding of a high fat diet induces changes in the organism which permit higher sustained rates of heat production in the cold. (Author's abstract)

7431

Leithead, C. S.,

and L. A. Leithead

LEVELS OF URINARY-CHLORIDE EXCRETION IN A HOT CLIMATE.—Trans. Royal Soc. Tropical Med. and Hygiene (London), 51 (4): 294-295. July 1957. DNLN

Histograms of the sodium chloride content of random samples of urine from 2,043 men (Kuwait oil company employees) exposed to a high environmental

temperature were made and analyzed according to nationality and to apparent state of health. The histograms showed: (1) a wide range of urinary salt excretion, with a raised lower limit in normal British and Arab employees; (2) mean values for all men (except those suffering from heat illness) were equal to, if not greater than, the mean values usually quoted for Europeans in cool climates; and (3) strikingly low urinary salt excretion for cases of heat illness (heat syncope or collapse, anhydrotic heat exhaustion, salt and urinary deficiency heat exhaustion, heat hyperpyrexia and heat stroke).

7432

Lemaire, R.,
and R. Jolly

[EFFECT OF SAHARA SAND WINDS ON THE CARDIOVASCULAR SYSTEM] Action des vents de sable sahariens sur l'appareil cardio-vasculaire. — Médecine aéronautique (Paris), 12 (2):161-166. 1957. In French, with English summary (p. 166).
DLC (TL555.M394, v. 12)

A survival experiment was conducted in the eastern part of the Sahara desert with 18 subjects between 26 and 49 years of age. Dry temperature in the shade was 41.7° C. Sand winds characterized by high air speed and dust density, and electrical conditions were found to exert a harmful effect on the body. These effects were especially noted in the neurovegetative system. Deficiency of thermolysis resulted in hyperthermia, tachycardia, and abnormal systolic hypertension. This abnormality was possibly caused by the combined action of the increase in heat received by convection and by changes in the electrostatic conditions of the atmosphere.

7433

Lewis, R. B.

THERMAL TRAUMA INCIDENT TO HIGH SPEED AND HIGH ALTITUDE FLYING.—Amer. Jour. Surg., 93 (4): 727-731. April 1957.

DLC (RD1.A37, v. 93)

Thermal problems, due to either cold or heat, will occur in high-altitude, high-speed aircraft, and the degree and nature of the stress will be determined by the velocity and altitude of the craft. The ideal way to alleviate these thermal problems would be by prevention. Although much has been done in this direction and more advances will be made, it cannot be assumed that the difficulties will be solved completely and that thermal injury will not be encountered in these high-performance aircraft. The pathogenesis of local burn and local cold injuries are discussed as well as methods for their treatment.

7434

Lind, A. R.,
and R. F. Hellon

ASSESSMENT OF PHYSIOLOGICAL SEVERITY OF HOT CLIMATES. — Jour. Applied Physiol., 11 (1): 35-40. July 1957. DLC (QP1.J72, v. 11)

Ten healthy, young, acclimatized men were exposed to eight different climates to assess the accuracy of the Effective Temperature scale and the P4SR (Predicted 4-Hour Sweat Rate) scale. The subjects remained seated throughout the exposures to heat, to approximate the metabolic conditions of the experiments from which the Effective Temperature scale was originally devised. Climates with the same Effective Temperature did not result in the same physiological

stress as judged by tolerance times, rectal temperatures, pulse rates, skin temperatures and forearm blood flows; the scale proved inadequate as a method of predicting the relative severity of these environments. The P4SR scale, however, accurately predicted the order of severity of the eight climates investigated and can be used confidently within the range environment and conditions investigated. (Authors' abstract)

7435

Masabumi, K.

[STATUS OF SKIN TEMPERATURE OF FINGERS AND TOES EXPOSED TO LOW TEMPERATURE]. — Japanese Safety Forces Med. Jour. (Tokyo), 4 (10): 18-20. Oct. 1957. In Japanese, with English abstract (p. 2-3).
DNLN

The skin temperature of fingers and toes of persons exposed to a room temperature of 16° C. and then transferred to a temperature of 6° and 9° C. decreased like an exponential function and eventually indicated approximately the same value as the interior room temperature. Cooling index and time interval required to balance the skin temperatures to interior room temperature were measured for each man to get the quantity indicating the mechanism for the lowering of the skin temperature. No significant difference was found between the values of persons exposed or not exposed to cold. (Author's abstract, modified)

7436

Masterton, J. P.,

H. E. Lewis, and E. M. Widdowson

FOOD INTAKES, ENERGY EXPENDITURES AND FAECAL EXCRETION OF MEN ON A POLAR EXPEDITION.—Brit. Jour. Nutrition (London), 11 (4): 346-358. 1957. DLC (TX501.B75, v. 11)

Dietary surveys and measurements of the time spent at different activities, at the base camp and during a sledging expedition, were made on four members of the British North Greenland Expedition. At the base camp the men's food provided 3000-4000 Cal./day (except for one man who took 4000-5000 Cal.). While sledging the men took about 4800 Cal./day. The estimated daily energy expenditures on the expedition generally corresponded to the calorie intakes at the base camp, but were greater than the intakes when the subjects were sledging. Although the men ate 270 grams of fat a day while sledging, they absorbed 96% of it and their feces contained only 23% fat on a dry-weight basis, a figure within normal limits. The percentage of nitrogen in the feces was also normal. (Authors' summary, modified)

7437

Nemets, L. L.,
and V. M. Lizarakii

[ON THE REQUIREMENT OF VITAMIN C IN THE FAR NORTH DURING WINTER] K voprosu ob obezpechennosti organizma vitaminom C v usloviakh krainego Severa v zimnii period. — Voenno-meditsinskii zhurnal (Moskva), 1957 (1): 67-69. Jan. 1957. In Russian. DLC (RC970.V55, v. 1957)

Observations on 160 healthy persons who had been living in the Far North for one year or longer showed that a daily ascorbic acid intake of 75-100 mg. is necessary.

7438

Newton, J. M.,

and L. J. Peacock

THE EFFECTS OF AUXILIARY TOPICAL HEAT ON

MANUAL DEXTERITY IN THE COLD.—Army Medical Research Lab., Fort Knox, Ky. (Project no. 6-95-20-001, Subtask USAMRL S-4). Report no. 285, June 16, 1957. ii+33 p. AD 135 239 PB 136 859

When sufficiently intense auxiliary heat is applied to the forearms, there is a lessening of decrement in manual dexterity due to exposure to cold and a concomitant lessening of the drop in skin temperature of the hand due to such exposure. While the observed effects of auxiliary topical heat are statistically significant, their magnitude is not sufficiently great to be of practical significance in protecting unshielded hands from the effects of exposure to cold. (From the authors' abstract)

7439

Nungesser, W. C.

EFFECTS OF OUTDOOR COLD EXPOSURE ON RENAL FUNCTION IN DOGS [Abstract].—Physiologist, 1 (1): 64-65. Nov. 1957. DNLM

Dogs were exposed to outdoor cold ranging from 0° to -25°C. for 1-2 hours. Control experiments to determine the effects of time on the observed functions showed a decrease or no change in glomerular filtration rate (GFR), an increase in renal plasma flow (RPF), decreases in urine volume, osmolality, and sodium and chloride excretion, and an increase in osmolar urine to plasma (U/P) ratio. When cold exposure followed observations at laboratory room temperature, GFR and RPF increased and the other renal functions listed were either increased or decreased. On the other hand, when cold exposure preceded laboratory room temperature observations, changes in GFR and RPF in the cold were variable, while urine volume and sodium and chloride excretion increased. Urine osmolality and osmolar U/P ratio decreased. No significant change in rectal temperature was seen during exposure to cold of this intensity and duration. (Author's abstract, modified)

7440

Osiba, S.

THE SEASONAL VARIATIONS OF BASAL METABOLISM AND ACTIVITY OF THYROID GLAND IN MAN.—Japan. Jour. Physiol. (Nagoya), 7: 355-365. March-Dec. 1957. DNLM

Basal metabolism measured in 9 males every month throughout one year or two in a room at uniform temperature underwent seasonal changes, increasing progressively with cold, and decreasing with warm. It was higher in the spring than in the fall, even when the environmental temperature was the same. Monthly determinations of blood protein-bound iodine made on 4 subjects throughout the year, showed seasonal variations similar to that of basal metabolism, indicating a clear correlation between the two. Both basal metabolism and protein-bound iodine could be modified by changing the environmental temperature to a summer level (about 30° C.) from the winter cold (about 9° C.) for over a week or so. It is concluded that thyroid activity presents adaptive changes to seasonal changes of environmental temperature and thereby induces seasonal alteration of basal metabolism. (Author's summary, modified)

7441

Pagé, E.

BODY COMPOSITION AND FAT DEPOSITION IN RATS ACCLIMATED TO COLD.—Revue canadienne de biologie (Montreal), 16 (2): 269-278. June 1957. In English. DLC (QH301.R47, v. 16)

The beneficial effects of high-fat diets in rats liv-

ing in a cold environment reside in the economy of food utilization which characterizes such diets, irrespective of environmental temperatures. The sparing action of fats on caloric expenditures becomes manifest under cold conditions at a time when the animals had already become acclimated and were presumably repleting their fat stores. Respiratory quotient studies, and others, indicate that fats rather than carbohydrates are the primary fuel for extra heat production in the cold. Whether this entails a higher degree of lipogenesis when the animals are in positive energy balance is still debatable at least in so far as extra hepatic tissues are concerned. (From the author's conclusions)

7442

Paschke, K. E.,

D. A. DeBias, and A. Cantarow
EFFECT OF CHLORPROMAZINE AND AUTONOMIC BLOCKING AGENTS ON SURVIVAL OF HEAT-STRESSED ADRENALECTOMIZED RATS.—Jefferson Medical Coll., Philadelphia, Pa.; issued by School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 57-120, Aug. 1957. 7 p. AD 143 449 PB 132 177

Chlorpromazine increased the survival rate of heat-stressed (37.5° to 38.5° C. for 6 hours) adrenalectomized rats, its effect being enhanced by addition of subprotective doses of hydrocortisone. Pendiomide ditartrate was ineffective when given alone, but was protective when added to subprotective doses of hydrocortisone. Dibenzamine, regitine, and probanthine appeared to be detrimental under the experimental conditions employed. The mechanism underlying the protective effect of chlorpromazine and pendiomide is not clear, but it apparently does not involve body temperature control. The observations reported here, in conjunction with those reported previously, suggest that the mechanisms of protection against heat and cold exposure differ from those involved in protection against other types of stress. (Authors' abstract)

7443

Peacock, L. J.,

and R. A. Marks
BEHAVIORAL CONCOMITANTS OF COLD ADAPTATION. I. RATE OF RESPONDING AT 2.5° C.—Army Medical Research Lab., Fort Knox, Ky. (USAMRL Project no. 6-95-20-001, Subtask S-4). Report no. 283, June 7, 1957. ii+7 p. AD 132 957

UNCLASSIFIED

A behavioral difference was found between normal and cold-acclimatized rats in an operant conditioning situation (bar-pressing) with radiant heat as a reward. Acclimatized animals responded at a higher rate during test conducted at 2.5°C than did normal animals. (Authors' results)

7444

Peacock, L. J.,

and R. A. Marks
BEHAVIORAL CONCOMITANTS OF COLD ADAPTATION. II. RATE OF RESPONDING AT -5° C.—Army Medical Research Lab., Fort Knox, Ky. (USAMRL Project no. 6-95-20-001, Subtask no. S-4). Report no. 284, June 10, 1957. ii+4 p. AD 132 954

UNCLASSIFIED

In an operant conditioning situation with radiant heat as reward occurs at another low ambient temperature. Cold acclimatized animals responded more frequently than normals when both were tested at -5° C., thus extending the results of an earlier study

done at 2.5° C. The demonstrated behavioral difference indicates that the phenomenon is likely to occur at other low temperatures. Such a behavioral index of acclimatization can be used to investigate the nature of the adaptation process. (Authors' abstract, modified)

7445

Peacock, L. J.,
and R. A. Marks

BEHAVIORAL CONCOMITANTS OF COLD ADAPTATION. III. TEMPORAL DEVELOPMENT OF BEHAVIORAL DIFFERENCES.—Army Medical Research Lab., Fort Knox, Ky. (Project no. 6-95-20-001, Subtask USAMRL S-4). Report no. 298, July 31, 1957. 1-5 p. AD 139 082 UNCLASSIFIED

An investigation was made of the time course of development of behavioral differences between normal and cold exposed rats. Behavioral differences between the two groups became pronounced on the fifth day of continuous cold exposure. Behavior recorded was bar pressing activity (which resulted in radiant heat reward) in low ambient temperature. Response rate with heat reward (3:1 ratio reinforcement) shows changes which correspond temporarily to changes in traditional indices of acclimatization. (Authors' abstract)

7446

PROTECTION AND FUNCTIONING OF THE HANDS IN COLD CLIMATES.—Ed. by F. R. Fisher. 176 p. Washington, D. C.: National Academy of Sciences-National Research Council, 1957. UNCLASSIFIED

Proceedings are presented of a conference on protection and functioning of the hands in cold climates. Papers presented at this conference include the following: (1) Effects of cold on hand activities, with special reference to joints and fluid viscosities, by J. Hunter; (2) Heat transfer through the hand, by G. W. Molnar; (3) General body cooling and hand cooling, by J. P. Meehan; (4) Effect of temperature on manual performance, by E. R. Dusek; (5) Tactile sensitivity in the cold, by A. W. Mills; (6) The effects of equipment design on manual performance, by J. Lyman; (7) Kinesiological parameters of the hand, by M. G. Scott; (8) Conceptual models for operational requirements, by T. B. Sheridan; (9) Remote manipulation, by W. Thompson; (10) Second skin project, by H. Meyer; (11) The Thermit type heat cartridge, by K. W. Hanlon; (12) Development of a new instrument for cardiac surgery, by A. R. Baer; and (13) Principles of handwear design in relation to functional capability, by S. J. Kennedy. (91 references)

7447

Rennie, D. W.,
and T. Adams

COMPARATIVE THERMOREGULATORY RESPONSES OF NEGROES AND WHITE PERSONS TO ACUTE COLD STRESS.—Jour. Applied Physiol., 11 (2): 201-204. Sept. 1957. DLC (QP1.J72, v. 11)

Eight white and eight Negro combat infantrymen stationed at Fairbanks, Alaska, were subjected to an acute cold test during the summer and winter seasons of 1955-1956. The cold test consisted of lying supine at an air temperature of -12° C. with hands and fingers bare. Clothing was worn otherwise. Skin, rectal, and digital temperatures and oxygen consumption were continually recorded during the cold exposure. Body heat debt during the tests was the same for both groups during each

season. The fingers of the Negro subjects cooled significantly more than those of the white subjects and cold vasodilatation was rare among the Negroes. The rise in metabolism during cold exposure was significantly less in the Negro group. No seasonal effect on these responses was observed. Possible relation of these facts to operational efficiency in a cold environment and to local cold injury are discussed. (Authors' abstract)

7448

Riedesel, M. L.

EFFECTS OF CONDITIONS OF REST ON RESPONSES TO WORK IN HEAT [Abstract].—Physiologist, 1 (1): 71-72. Nov. 1957. DNLM

Subjects performed three 20-minute jobs under thermal conditions previously established as tolerable (but difficult) for a single half hour. Rest was permitted after each exposure and until heart rate returned to its initial control value plus 5 beats/minute. Resting environment was warm (W) (96° F.) or thermally neutral (N) (86° F.). The four subjects were able to complete the three job periods with rest N, but two could not undertake the third exposure with W. Heart rate and rectal temperature rose to higher levels when rest W was used. For a representative subject, cost of effort (3 jobs plus 3 rests) under W was 35% more sweat, 60% more heart beats, 110% more degree x minutes of elevated rectal temperature, 300% more rest time, and 100% more total time. It is concluded: (1) the heart rate index used is not an adequate criterion of unstorage of body heat or of recovery; (2) strain is markedly reduced and efficiency increased when thermally neutral rest environments are utilized. (Authors' abstract, modified)

7449

Rodahl, K.

HUMAN ACCLIMATIZATION TO COLD.—Arctic Aeromedical Lab., Ladd Air Force Base, Alaska. Technical Report no. 57-21, Oct. 1957. 50 p.

UNCLASSIFIED

Previous studies of human acclimatization to cold are reviewed and compared with data from animal experiments. Results from Eskimo studies are summarized in terms of environmental exposure, activity, food intake, metabolic response, thyroid activity, evaporative heat loss, changes in blood and tissues, and physical fitness. The mechanism of general acclimatization to cold is discussed, and various aspects of local acclimatization are considered. Finally, certain promising areas of future research are suggested. (Author's abstract) (65 references)

7450

Rodahl, K.,
and G. Bang

THYROID ACTIVITY IN MEN EXPOSED TO COLD.—Arctic Aeromedical Lab., Ladd Air Force Base, Alaska. Report no. 57-36, Oct. 1957. 84 p.

UNCLASSIFIED

An assessment is made of thyroid function (as judged by thyroid uptake, urinary elimination, and blood levels of I¹³¹, and by protein-bound iodine) during the cold exposure usually encountered during normal Arctic living or operation. Tracer studies of up to 65 microcuries I¹³¹ were used. No real differences in thyroid function were observed in comparisons among Whites and coastal, and Fort Yukon Indians. Differences were observed between inland Eskimos at Anaktuvuk Pass and mountain Indians at

Arctic Village, Alaska; these differences, however, were subsequently attributed to endemic goiter. It appears that the thyroid does not play a significant role in human acclimatization under the conditions studied.

7451

Roddie, I. C.,

J. T. Shepherd, and R. F. Whelan

A COMPARISON OF THE HEAT ELIMINATION FROM THE NORMAL AND THE NERVE-BLOCKED FINGER DURING BODY HEATING.—*Jour. Physiol.* (London), 138 (3): 445-448. Oct. 1957.

DLC (QP1.J75, v. 138)

Comparison of heat elimination from a nerve-blocked finger and an intact finger was made to observe any possible presence of a vasodilator substance formed by sympathetic activity. Four men, partially immersed in warm water (42-44° C.), had their little fingers immersed in warm water where the heat loss was measured. Nerve blockage was carried out with lignocaine. Results showed no difference in heat loss from the nerve-blocked or normal fingers. It is concluded that sympathetic activity probably does not cause the production of a vasodilator substance in the hand.

7452

Roddie, I. C.,

J. T. Shepherd, and R. F. Whelan

THE CONTRIBUTION OF CONSTRICTOR AND DILATOR NERVES TO THE SKIN VASODILATION DURING BODY HEATING. — *Jour. Physiol.* (London), 136 (3): 489-497. May 1957.

DLC (QP1.J75, v. 136)

Blood flow in the forearms of 8 men was measured before and during heating of the body. Atropine was given during these times to determine its effects on the vasodilation of the hand and forearm. After heating, the blood flow in the hand and forearm increased significantly, and at the onset of sweating the flow increased again. Atropine given before heating delayed the vasodilation for about 20 minutes, but after heating was well started it had no effect. The use of atropine gave no evidence for the presence of cholinergic fibers to the hand blood vessels. It is concluded that vasodilation of forearm vessels upon heating of the limb is under the control of vasodilator nerves, while in the hand dilatation is probably due to the release of vasoconstrictor tone.

7453

Rossiter, R. J.,

and D. Nicholls

PHOSPHORUS METABOLISM OF THE ADRENAL GLAND OF RATS EXPOSED TO A COLD ENVIRONMENT.—*Revue canadienne de biologie* (Montreal), 16 (2): 249-268. June 1957. In English.

DLC (QH301.R47, v. 16)

The incorporation of inorganic phosphate labeled with P^{32} into the inorganic phosphate of the adrenal gland is an index of pituitary-adrenal activity in normal rats subjected to conditions that stimulate the pituitary to release endogenous adrenocorticotrophic hormone. The incorporation of P^{32} into adrenal inorganic phosphate and also into adrenal lipid phosphate and ribonucleic acid nucleotides was studied in rats exposed briefly to a cold environment (+3° C.) and in rats exposed for longer periods of time. In rats acclimatized to cold for four weeks, the acute pituitary-adrenal response was less than

that of nonacclimatized animals when both groups were subjected to an environmental temperature less than that of the temperature of acclimatization. (Authors' summary) (57 references)

7454

Russell, R. W.

EFFECTS OF VARIATIONS IN AMBIENT TEMPERATURE ON CERTAIN MEASURES OF TRACKING SKILL AND SENSORY SENSITIVITY.—*Army Medical Research Lab., Fort Knox, Ky. (USAMRL Project no. 6-95-30-001). Report no. 300, Nov. 1, 1957. ii+69 p. AD 146 210*

UNCLASSIFIED

Effects of ambient temperatures, ranging from -10° to +40° C., on tracking skills using movement and pressure controls and on tactile and kinesthetic sensitivity and hand grip were investigated. The results showed that signs of impairment in performance appeared when temperature varied outside rather narrow limits and that the nature of the impairment differed in the two types of performance. They also showed that different sense modalities were differentially sensitive to temperature variations in terms of the duration of exposure necessary to produce signs of impairment and in terms of the characteristics of their recovery following exposure. (Author's abstract) (62 references)

7455

Scholander, P. F.,

H. T. Hammel, K. L. Andersen, and Y. Loyning

METABOLIC ACCLIMATION TO COLD IN MAN [Abstract].—*Federation Proceedings*, 16 (1, part I): 114-115. March 1957. DLC (QH301.F37, v. 16)

Eight men in essentially summer clothing lived out in the Norwegian mountains above the tree line (night temperatures between 0° and 5° C.). After six weeks in the field considerable acclimation was acquired. Heat production remained 50-60% higher than the basal all night and while they were asleep. Shivering, visible or detectable by electromyography, occurred frequently during sleep. Control subjects had a less elevated metabolic rate and were unable to rest and sleep due to chilling, especially of the feet. When bicycling naked in the cold, just enough to maintain the rectal temperature, the cold-acclimated men used as much oxygen as the controls, so neither during exercise nor during rest did acclimation result in increased insulation by shell cooling. (Authors' abstract, modified)

7456

Sellers, E. A.

ADAPTIVE AND RELATED PHENOMENA IN RATS EXPOSED TO COLD: A REVIEW.—*Revue canadienne de biologie* (Montreal), 16 (2): 175-188. June 1957. In English. DLC (QH301.R47, v. 16)

A review is presented of the literature dealing with experiments on cold-exposed rats. Special consideration is given to their acclimatization, energy requirements, intermediary metabolism and general metabolism, and adrenal and thyroid function during cold exposure. (28 references)

7457

Selye, H.

[ACQUISITION OF RESISTANCE TO NEPHROCALCINOSIS DURING COLD ADAPTATION] Acquisition de résistance à la néphrocalcinose au cours de l'adaptation au froid.—*Journal de physiologie* (Paris), 49 (5): 1021-1023. Nov. 1957. In French. DNLM

Cold exposure (0°C.) for ten days protected the rat against the appearance of nephrocalcinosis normally produced by an excess of phosphorus. The phenomenon of resistance is probably due to stimulation of the thyroid during cold adaptation.

7458

Smirnov, K. M.,
and E. L. Skliarchik

1957

[CHARACTERISTICS OF SALIVATION IN MEN AT DIFFERENT STAGES OF ACCLIMATIZATION TO A HOT CLIMATE] Osobennosti sliunootdeleniia u liudei, razlichno akklimatizirovannykh k zharkomy klimatu. — *Fiziologicheskii zhurnal SSR (Moskva)*, 43 (5): 389-392. May 1957. In Russian.

DLC (QP1.F57, v. 43)

In hot climates, stimulants such as water or diluted acetic acid induced parotid salivation to a lesser degree in nonacclimatized than in acclimatized persons. This suggests that the thermal stimulation in nonacclimatized persons alter the functional conditions of the heat and thirst centers.

7459

Spioch, F. M.

[ON THE EFFECT OF HEAT, HUMIDITY, AND THE ADRENOCORTICOTROPIC HORMONE (ACTH) ON THE BEHAVIOR OF EOSINOPHIL LEUKOCYTES IN THE PERIPHERAL BLOOD OF MAN] Über den Einfluss der Hitze, der Feuchtigkeit und des adrenocorticotropen Hormons (ACTH) auf das Verhalten der eosinophilen Leukocyten im peripheren Blute des Menschen. — *Pflügers Archiv für die gesamte Physiologie (Berlin)*, 264 (5): 513-519. 1957. In German.

DLC (QP1.A63, v. 264)

The mean eosinophil count in blood samples collected from miners at 9:30-10:30 a.m. during normothermic conditions was 174 ± 6.7 per mm.³ blood. After two hours' exposure to heat (50°C.) the count was lowered by 41.6% in 220 miners. After injection of 25 mg. ACTH in 62 miners the average drop in the eosinophil count amounted to 53%. Twenty-nine miners who did not show a significant drop in the eosinophil count after heat stress reacted very strongly to ACTH injections. Red blood cell count had returned to normal 48 hrs. after reaction to heat stress. Comparative analysis of cell morphology indicated increased destruction and cytolysis of the eosinophils in heat stress and ACTH stress.

7460

Spurr, G. B.,

B. K. Hutt, and S. M. Horvath

SHIVERING, OXYGEN CONSUMPTION AND BODY TEMPERATURES IN ACUTE EXPOSURE OF MEN TO TWO DIFFERENT COLD ENVIRONMENTS. — *Jour. Applied Physiol.*, 11 (1): 58-64. July 1957.

DLC (QP1.J72, v. 11)

Skin and rectal temperatures, oxygen consumption, respiratory minute volume, carbon dioxide production, respiratory quotient and shivering were recorded in 11 experiments on 9 nude male adults before, during and after sudden exposure to a 10° C. environment. The results are compared statistically with those of experiments in an ambient temperature of -3° C. In the 10° C. environment the first tremors of shivering appeared in 6.43 minutes and generalized shivering in 10.25 minutes. These times were significantly longer than those observed in the -3° C. environment. However, the average mean skin and mean body temperatures of the two groups of subjects were not significant-

ly different at the time the first tremors of shivering and generalized shivering commenced, suggesting that the temperature receptors may sense absolute temperature as well as responding to rate of change. The respiratory minute volume, oxygen consumption and respiratory quotient showed significant increases as a result of the exposure to 10° C. and shivering. From a consideration of the data on the ventilation equivalent and the percentage of carbon dioxide in expired air, it is suggested that the rise in respiratory quotient observed in both ambient temperatures was a true increase and not due entirely to over ventilation on the part of the subjects. It was estimated that in the 10° C. environment shivering was approximately 5.9% efficient in protecting the body against total heat loss. This was significantly reduced below the value of 11.6% observed at -3° C. It appeared, therefore, that shivering afforded relatively greater partial protection to the total body heat content in the colder environment. (Authors' abstract)

7461

Steen, J.

FOOD INTAKE AND OXYGEN CONSUMPTION IN PIGEONS AT LOW TEMPERATURES. — *Acta physiologica scandinavica (Stockholm)*, 39 (1): 22-26. 1957. In English.

DNLM

The daily food intake was measured in five pigeons while they were kept for 2-4 weeks at -10° C., +18° C., and -24° C. At the end of each period the oxygen consumption was measured at various temperatures between -35° C. and +20° C. It was found that the food intake was closely correlated with the oxygen consumption, both of them indicating nearly the same critical temperature. Below this temperature both oxygen consumption and food intake increased linearly with the body-to-air gradient. (Author's summary)

7462

Taylor, C. L.

DESCRIPTION AND PREDICTION OF HUMAN RESPONSE TO AIRCRAFT THERMAL ENVIRONMENTS. — *Trans. Amer. Soc. Mechanical Engineers*, 79 (5): 1024-1028. July 1957. DLC (TJ1.A7, v. 79)

The physiological and biophysical basis of human response to high environmental temperatures is discussed, and the state of adaptation, whether compensated or noncompensated, is graphically displayed. In the range of compensation, both comfort and non-comfort steady states are to be expected. Depending upon the clothing worn and the conditions of altitude, humidity, etc., the upper margin of the zone in which compensation may occur is about 110° F. The man-clothing-environment system is analyzed by use of biophysical heat-transfer formulations which take into account experimentally determined body heat and temperature parameters. Chief among these is a heat-storage index which is calculable from the conditions of environment and clothing. Time-tolerance and time-performance relationships with the heat-storage index were experimentally determined. A prediction chart is included for the use of aircraft designers, which permits a rapid calculation of tolerance and performance times for a wide range of environmental and clothing conditions. (Author's summary)

7463

Telchener, W. H.,

MANUAL DEXTERITY IN THE COLD. — *Jour. Applied Physiol.*, 11 (3): 333-338. Nov. 1957.

DLC (QP1.J72, v. 11)

The effects of the cold on manual dexterity were studied by relating performance time on the Minnesota Rate of Manipulation Test to air temperature and velocity, windchill, mean surface skin temperature, digital temperature of the working hand, and rate of digital cooling using data from 530 subjects sorted into 14 different combinations of air temperature and wind for an exposure period of approximately 60 minutes. Air temperature and windchill were found to increase performance time significantly; wind velocity did not have a significant effect by itself; mean surface skin temperature was slightly, but significantly, inversely correlated with performance time only for nude men; digital cooling rate and digital temperature were not demonstrated to be related to performance time. (Author's abstract)

7464

Trapani, I. L.

ANTIBODY DECAY RATES IN COLD-EXPOSED RABBITS [Abstract].—Federation Proceedings, 16 (1, part 1): 436-437. March 1957.

DLC (QH301.F37, v. 16)

The response of cold-adapted animals to intravenous injection of homologous anti-BSA γ -globulin solution was compared to that of animals placed in the cold only 18 hours prior to passive immunization and also of animals maintained at room temperature. Cold-exposed animals were found to exhibit a more rapid antibody decay rate than normal animals kept at room temperature. (Author's abstract, modified)

7465

Treadwell, C. R.

EFFECT OF LIPOTROPIC FACTORS ON COLD PHYSIOLOGY. III. KETONE BODY LEVELS IN THE COLD.—George Washington Univ. School of Medicine, Washington, D. C. (Contract AF 18(600)-463); issued by Arctic Aeromedical Lab., Ladd Air Force Base, Alaska (Project no. 7952-5). Technical Note no. AAL-TN-57-25, Sept. 1957. [17] p. AD 230 835 UNCLASSIFIED

The effects of protein, fat, and carbohydrate contents of the diet on fat metabolism and especially on the development of ketosis in the cold, including the relation of age, sex, previous diet, and duration of exposure to cold, were investigated. Results indicated that cold is an effective lipotropic agent. No demonstrable requirements were found for lipotropic factors in the cold in rats receiving diets containing up to 40% fat. The principle effect of cold on the lipids of the liver, blood, adrenals, and kidneys was to produce a marked decrease (to normal levels) in the neutral fat fraction. Cold, over a 3-week period, did not lower the free or ester cholesterol content of the adrenals, indicating a later adjustment of the animals to the immediate stress of cold. Animals in the cold on high-fat diets can utilize large amounts of fat without a metabolic ketosis. In changing from a low-fat diet to a high-fat diet an immediate response of an increase in the blood lipid fractions was observed both at 25° and at 1°C. During the 3-week period there is a gradual return to control levels at both temperatures. Animals at 1°C. metabolize large amounts of fat without an increase in blood lipids over the levels of comparable animals at 25°C. The data on ketosis in the cold suggests that previous reports of metabolic ketosis were caused by an actual or relative deficiency of calories. (AD abstract)

7466

Vaughan, D. A.,

and L. N. Vaughan

EFFECT OF COLD ON THIAMINE-DEFICIENT RATS [Abstract].—Federation Proceedings, 16 (1, part 1): 131. March 1957. DLC (QH301.F37, v. 16)

Fifty young adult rats (230-270 grams) were divided into two groups. Twenty-five were subjected to moderately severe cold (5° C.); 25 were maintained at 25°-28° C. Each group was divided into five subgroups which received a thiamine-deficient diet for 18 days, supplemented with various levels of thiamine. A statistical analysis indicated that there was no significant difference in weight response between the warm and cold rats at deficient levels of thiamine intake. The relation of weight changes to food intakes suggested that the cold rats used an approximately constant increment of food for their extra energy requirements in the cold. This increment indicates that needs for thiamine in the cold are governed by increased caloric requirements. (Authors' abstract, modified)

7467

Vaughan, D. A.,

and L. N. Vaughan

THE EFFECT OF A LOW ENVIRONMENTAL TEMPERATURE ON THE WEIGHT AND FOOD CONSUMPTION OF THIAMINE DEFICIENT RATS. — Jour. Nutrition, 63 (3): 417-424. Nov. 1957.

DLC (RM214.J6, v. 63)

Male rats were kept at 25° C. and 5° C., respectively, and some received adequate or sub-adequate amounts of thiamine in the diet. There did not appear to be any significant differences in weight loss or gain in the rats at different temperatures when the dose levels of the thiamine were the same. Weight loss in the thiamine-deficient rats was a function of decreased food intake, and the cold did not seem to have an effect on weight changes. The rats kept at 5° C. ate constantly more than the others by an amount of about 10 grams per day. It is thought that the fraction of the appetite stimulated by the greater energy expenditure in the cold is not subject to the lack of appetite caused by thiamine deficiency.

7468

Veghte, J. H.,

and P. Webb

CLOTHING AND TOLERANCE TO HEAT.—Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio (Project no. 7155, Task no. 71804). WADC Technical Report no. 57-759, Dec. 1957. iii+10 p. AD 142 248 PB 131 705

A series of experiments has been conducted to determine the effect of clothing on human tolerance to hot environments (90° to 160° F.). Exposures were made in five different clothing assemblies which were representative of permeable and impermeable, lightweight and heavily insulated Air Force clothing. The effect of the exposures was measured in terms of physiological strain. These experiments show to what extent impermeable clothing, as compared with permeable clothing, reduces human tolerance to heat, regardless of insulation value. Insulation alone serves a protective function in heat. However, a heavy permeable assembly by addition of several permeable layers proved to be functionally impermeable. (Authors' abstract)

7469

Weiss, A. K.

1957

SEVERE COLD-EXPOSURE OF LARGE RATS
[Abstract]. — Federation Proceedings, 16 (1,
part I): 134-135. March 1957.

DLC (QH301.F37, v. 16)

Exposure of 150-g. male rats to 5° C. for about 5 days or longer results in elevated oxygen consumption rates of preparations from the liver, skeletal muscle, diaphragm, cardiac muscle and kidney cortex. When this experiment was repeated with larger and older rats weighing 300 gm. or more, no changes were discernible in any of the tissues studied except the liver. Prolongation of cold-exposure to one month did not change the oxygen consumption rates of tissues other than the liver. When large rats were exposed to -5° C., they were unable to withstand the adverse climate; the mean survival time was around 9 days. The oxygen consumption rates of several tissues from animals which had survived at -5° C. for 10 days were measured. The liver was the only tissue studied whose metabolic rate was significantly elevated. (From the author's abstract)

7470

Weiss, B.

THERMAL BEHAVIOR OF THE SUBNOURISHED AND PANTOTHENIC ACID-DEPRIVED RAT.—School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 57-25, Jan. 1957. 5 p. AD 136 283

PB 130 055

Rats were trained, at a temperature of 0° C., to obtain a burst of heat from a heat lamp by pressing a lever. They were then placed on a diet deficient in pantothenic acid during which they steadily lost weight. Next, they were divided into three groups: high pantothenic acid supplements, low pantothenic acid supplements, and no supplements. As measured by frequency of lever-pressing, the high-supplement animals were least affected by cold exposure, the nonsupplemented animals most affected. (Author's abstract)

7471

Weiss, B.

PERFORMANCE AND FOOD INTAKE AT LOW TEMPERATURES [Abstract].—Federation Proceedings, 16 (1, part I): 135. March 1957.

DLC (QH301.F37, v. 16)

In the first experiment, 30 rats in a box containing a lever which could be pressed to deliver a pellet of food were exposed to temperatures of 0°, 10°, and 20° C. for 20 minutes daily for a period of 24 days. Feeding otherwise was allowed for 1 hour daily directly after cold exposure. Food intake data showed an initial depression at 0° and 10°, however, after the third period it was restored to the expected basis of metabolic cost. Performance data also showed a sharp initial inhibition and subsequent rise. The second experiment used temperatures of -10° and 20°, with 30 rats alternating for 6-day periods between these. Both performance and food intake data showed a step rise for the first few days and then a leveling off. Both performance and metabolic adjustment criteria revealed not only that acclimatization arises from brief exposures, but that these were highly specific to temperature. (Author's abstract, modified)

7472

Welch, B. E.,

L. M. Levy, C. F. Consolazio, E. R. Buskirk, and
T. E. Dee

CALORIC INTAKE FOR PROLONGED HARD WORK IN THE COLD.—Medical Nutrition Lab. (U. S. Army), Denver, Colo. Report no. 202, March 22, 1957. 1-24 p. AD 126 212 PB 133 770

Caloric intake, fluid balance and body composition were studied in a group of 26 men during a 28-day stay at Fort Churchill, Manitoba, Canada. The first seven days were spent in a pre-bivouac situation preparing for bivouac. The remaining days were spent in the field in a moving self-sustaining bivouac. During the pre-bivouac period the caloric intake averaged 3355 Calories per man. During the bivouac the intake was increased to 4163 Calories/man/day. The latter figure may be regarded as a maximal figure for sustained (more than five days) hard work in the cold. A mean weight loss of 1.19 kg./man was observed during the bivouac. This weight loss was accompanied by a corresponding increase in body density which indicated some loss of fat. (From the authors' summary)

7473

Welch, B. E.,

1957

L. M. Levy, C. F. Consolazio, E. R. Buskirk,
and T. Dee

ENERGY REQUIREMENTS OF MEN IN SUBARCTIC BIVOUAC [Abstract]. — Federation Proceedings, 16 (1, part I): 401-402. March 1957.

DLC (QH301.F37, v. 16)

A group of 26 healthy soldiers were placed on the Army C-ration for a period of 37 days. The first 8 days were a control period (I) at Natick, Massachusetts; the second 8 days a prebivouac period (II) at Fort Churchill, Canada; and the remaining 21 days divided into 3 bivouac periods (III, IV, V) of 7 days each. The caloric intake at Natick (I) was 2536 calories, the lowest of the periods studied. As the activity was increased, the caloric intake increased, reaching a high of 4488 calories during the 3rd bivouac (V). The bivouac periods (III, IV, V) averaged 4196 cal./day. Average total body water and body weight showed a decrease during the course of the test. Body density increased during the bivouac periods. (From the authors' abstract)

7474

Wertheimer, E.,

and V. Bontor

ADAPTATION OF YOUNG AND OLD RATS TO SHORT COLD EXPOSURE.—Gerontologia (Basel), 1 (5): 306-312. 1957. DNLM

After a single short cold exposure (6° C.) the glycogen synthesis and glucose utilization by the diaphragm of 42-day-old rats was increased. Daily repeated short cold exposures (6° C.) reduced glycogen synthesis and insignificantly raised glucose utilization in the rat diaphragm in comparison to the diaphragm of an untreated control rat. A daily exposure to 6° C. for 1 1/2 hours sufficed to cause adaptation. Older rats (5-6 months) did not give the usual metabolic reaction to a single cold exposure. After repeated daily adaptive cold treatment, however, an increase in glycogen synthesis by the diaphragms of such rats was observed, similar to the response obtained in young rats after initial exposure. (Authors' summary, modified)

7475

Wojcieszak, I.,

and J. Jaworski

[AN ATTEMPT TO ESTABLISH A WARMING

METHOD FOR SWIMMERS AND ITS PRACTICAL EFFICIENCY] Próba ustalenia sposobu rozgrzewki dla pływaków i jej skuteczności w praktyce. — *Acta physiologica polonica* (Warszawa), 8 (3-3a): 571-572. 1957. In Polish. DLC (QP1.A27, v. 8)

Hot water showers (45° C.) and physical exercise increased blood pressure, heart rate, respiration and body temperature in 30 professional swimmers. The time required to swim 50 and 100 meters decreased in 10 out of 11 and in 25 out of 28 swimmers, respectively, after they had subjected themselves to this "warming method". The effect was most pronounced in the less trained swimmers and may be attributable to the preliminary conditioning of the organism (supply and better utilization of oxygen and removal of waste products).

7476

Woods, J. W.

THE EFFECTS OF LONG-TERM EXPOSURE TO COLD UPON ADRENAL WEIGHT AND ASCORBIC ACID CONTENT IN WILD AND DOMESTICATED NORWAY RATS.—*Jour. Physiol. (London)*, 135 (2): 384-389. Feb. 1957. DCL (QP1.J75, v. 135)

Wild and domesticated rats were kept at 4° C. for as long as 26 days, and a striking difference appeared in that hypertrophy of the adrenals only occurred in the domesticated animals and not in the feral ones. Ascorbic acid content in both groups was the same, and it remained unchanged after exposure to cold. Possible explanations of the difference in adrenal weights between the feral and domesticated strains are discussed.

7477

Wyndham, C. H.,

and G. E. Jacobs

LOSS OF ACCLIMATIZATION AFTER SIX DAYS OF WORK IN COOL CONDITIONS ON THE SURFACE OF A MINE.—*Jour. Applied Physiol.*, 11 (2): 197-198. Sept. 1957. DLC (QP1.J72, v. 11)

Seventy-three men after 12 days of acclimatization in a mine at 91° F. wet bulb temperature spent 6 days at the relatively cool surface. Upon return to the heat mouth temperatures increased significantly, indicating a loss of heat acclimatization within the 6 days. It is suggested that miners should be acclimatized for at least 1-2 days before re-exposure to heat from cool conditions.

g. Sound, Noise, and Vibration

[Protective devices under 10-b; Effects of noise on hearing under 4-c; Noise characteristics of planes under 11-b]

7478

Bell, E.

THE ACTION OF ULTRASOUND ON THE MOUSE LIVER.—*Jour. Cellular and Compar. Physiol.*, 50 (1): 83-103. Aug. 1957. DLC (QP1.W533, v. 50)

Histological examination of the livers from mice irradiated with focused ultrasound of one megacycle frequency or with unfocused ultrasound of 27 megacycles frequency showed the sinusoids to be markedly enlarged and congested immediately following irradiation. The presence of erythrocytes in parenchymal cells and of glycogen granules in sinusoids and small blood vessels indicates cell

disruption and damage to vascular walls. Following liver injury with ultrasound of 1 or 27 megacycles frequency, mitosis did not begin within three days but was delayed until the fifth day after injury. This delay supports the hypothesis that the onset of mitosis depends upon the course of events in the zone of injury. During 15 seconds of irradiation with ultrasound of one megacycle the temperature rose in the liver at the rate of 1° C./second. Liver necrosis was not prevented by cooling the animals to 10° C. before exposing them to ultrasound. Necrosis was prevented by pre-cooling when the same rate of change of temperature occurred in livers treated for 15 seconds with concentrated radiant heat.

7479

Boes, A.

BIBLIOGRAPHY OF RESEARCH REPORTS AND PUBLICATIONS ISSUED BY THE BIO-ACOUSTICS BRANCH (1947-1957).—Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. [Unnumbered report], Sept. 1957. iii+22 p. AD 140 501 PB 143 944

This bibliography tabulates 183 publications (Technical Reports, Technical Notes, Memorandum Reports, and the more important journal publications) which resulted from research activities during the 1947-1957 period of the Bio-Acoustics Section (which became Bio-Acoustics Branch in July 1956), Aero Medical Laboratories, Wright Air Development Center. The subject matter contained in these publications are listed under the following 12 specific areas: (1) sound sources and noise fields, (2) sound propagation, (3) acoustic instrumentation, (4) noise control-general, (5) noise control structures, (6) hearing and physiology of the ear, (7) speech, (8) biological and psychological effects of noise, (9) ear protection, (10) mechanical characteristics of the human body: response to vibration, (11) general noise guides and criteria, and (12) miscellaneous. An author index is included.

7480

Bogdanovich, L. I.

[HISTOLOGICAL CHANGES IN THE SKIN OF RABBITS SUBJECTED TO CONTINUOUS AND PULSATING SUPERSONIC WAVES] Gistologicheskie izmeneniia v kozhe krolikov posle vozdeistviia na nee neprepyvnogo i pul'siruiushchego ul'trazvuka. — *Arkhiv patologii (Moskva)*, 19 (6): 24-29. 1957. In Russian, with English summary (p. 29). DNLM

Continuous ultrasonic waves applied for 10 minutes to the skin of rabbits, at a frequency of 1800 kilocycles and an intensity of 0.5-2.2 watts per cm.², produced slight swelling of the epithelium, edema of the outer layers of the skin, and peripheral vasodilation. Even waves of lesser intensity produced exudative and edematous changes, epithelial dystrophy, capillary stasis, vasodilation, degeneration of nerve fibers, and hemorrhage into the upper layers of the skin.

7481

Boiten, G. G.

[ASSESSMENT OF VIBRATION NUISANCE] Beoordeling van Trillingshinder. — Royal Aircraft Establishment (Gt. Brit.), Farnborough. Library Translation no. 695, Oct. 1957. [5 p.] AD 161 427

Translation, by R. C. Murray, of report from: Instituut T. N. O. voor Werktuigkundige Constructies, Def, Report 345, Sept. 1956.

UNCLASSIFIED

A brief statement of methods is presented of analysing a particular vibration spectrum or pattern into zones as a preliminary to assessing the vibrational nuisance level (from imperceptible to intolerable) of a particular source of vibration. Included are representative figures and tables. (Author's summary, modified)

7482

Broadbent, D. E.

EFFECTS OF NOISE ON BEHAVIOR.—In: Handbook of noise control, p. 10-1 to 10-34. Ed. by C. M. Harris. New York: McGraw-Hill Book Co., 1957. DLC (TA365.H3)

Behavior in response to noise may be measured by estimating the degree of annoyance, by observing the physiological changes in metabolism, respiration and muscular tension, and by evaluating the effects on work performance and efficiency. Functions known to be unaffected by noise are reaction time, judgment of distance, and motor functions. A review of the literature dealing with experiments on the effects of noise on intellectual and sensorimotor tasks reveals no clear and obvious results. Mistakes in task performance may show effects of noise but are serious only in tasks in which effects of prolonged work are also serious; these are tasks requiring completely continuous alertness with no remission. No effect on efficiency was found with noise levels below 90 decibels, although annoyance arises from such noises and causes harassing of speech communication. In general, the effects of noise on health or efficiency seem to be slight. (82 references)

7483

Broadbent, D. E.

EFFECTS OF NOISES OF HIGH AND LOW FREQUENCY ON BEHAVIOUR.—Ergonomics (London), 1 (1): 21-29. Nov. 1957. DLC (TA166.E7, v. 1)

Three groups of subjects worked for two sessions in noise at a five-choice serial reaction task. During one session the noise was restricted to frequencies above 2000 c.p.s., and during the other to frequencies below. The high-frequency noise gave more errors in performance, although the difference was significant only at the highest intensity of 100 db. When reaction times were measured to the same noises, the first reaction of a series with the same type of stimulus was slower when the stimulus was low intensity and low frequency. With high-frequency or high-intensity stimuli this was not so. It thus appears that sounds more likely to interfere with work also produce a faster reaction when themselves acting as signals, confirming a view already advanced about noise effects; that the effect is due to competition between various stimuli to control response. (Author's abstract)

7484

Cate, W. ten

VIBRATION NUISANCE (Trillingshinder).—Translated by R. C. Murray. Institut T. N. O. voor Werktuigkundige Constructies, Delft (Netherlands), Report 147, May 1953; issued by Royal Aircraft Establishment (Gt. Brit.), Farnborough. Library Translation no. 693, Oct. 1957. [17] p. AD 159 701

UNCLASSIFIED

A review is presented of published information on the evaluation of the nuisance levels of vibrations in houses, cars, and aircraft for personnel, with proposals for better studies based on opinion sampling. (Author's summary) (21 references)

7485

Cate, W. ten

APPENDICES TO REPORT 147 (MAY, 1953) ON VIBRATION NUISANCE (Aanvulling OP Rapport 147: Trillingshinder).—Institut T. N. O. voor Werktuigkundige Constructies, Delft (Netherlands) Report no. 150; Translation by R. C. Murray, issued by Royal Aircraft Establishment (Gt. Brit.), Farnborough. Library Translation no. 694, Oct. 1957. [10] p. AD 161 477

UNCLASSIFIED

Discussions are presented on several papers (in the form of three appendices) treating various aspects of vibration studies which have been published since the appearance of the report.

7486

Clemmedson, C. J.

RESPIRATORY AND CIRCULATORY VAGAL REFLEXES IN RABBITS EXPOSED TO HIGH EXPLOSIVE SHOCK WAVES. — Amer. Jour. Physiol., 190 (3): 467-472. Sept. 1957. DLC (QP1.A5, v. 190)

Changes in respiration and heart rate were studied in rabbits which were exposed to high explosive shock waves in a detonation chamber after bilateral cervical vagotomy, or after pulmonary vagal denervation with the innervation of the sinoaortic region and heart left intact. The rapid shallow breathing occurring after the detonation in non-denervated animals was almost completely absent after cervical vagotomy or pulmonary vagal denervation. Sometimes an often very long period of apnea preceded the tachypnea after the detonation in the control animals. In the denervated animals, especially in the pulmonary vagally denervated ones, apnea was rare or of only very short duration. The bradycardia that can be prevented by bilateral cervical vagotomy, was not elicited by reflexes from the lungs, as the heart rate was lowered to the same extent in the lung-vagus denervated as in the control animals. A cardiac standstill or severe distortions of the ECG waves during the first 1-3 seconds after the detonation were common in the non-denervated and in the lung-vagus denervated animals but were rare in animals in which bilateral cervical vagotomy had been made. (Authors' abstract)

7487

Cope, F. W.,

and B. D. Polis

SOME EFFECTS OF PROLONGED LOW FREQUENCY VIBRATION ON THE MOLECULAR AND CELLULAR COMPOSITION OF BLOOD.—Naval Air Development Center. Aviation Medical Acceleration Lab., Johnsville, Pa. (Project no. NM 11 01 12.12, Report no. 1). Report no. NADC-MA-5715, Nov. 6, 1957. iv+15 p. AD 209 172

UNCLASSIFIED

Rhesus monkeys strapped in a sitting position on a vertically rotating table top were exposed to vertical sinusoidal vibration of 0.1 inch amplitude and 20 c.p.s. frequency for three hours a day on 8-12 successive days. Control monkeys were similarly treated but not vibrated. On the first day of vibration, changes such as may be characteristic of the General-Adaptation-Syndrome (abrupt rise in neutrophile counts and plasma transaminase levels, followed by a gradual fall with the repetition of vibration on successive days) were observed. Plasma glucose and ascorbic acid levels and eosinophile counts, which are known to change with stress, were maximally depressed by the mild stress of handling the animals. No addi-

tional effect on these determinations could be ascribed to vibration. These data suggest that a rise in transaminase activity merely reflects a general response to a stressful state. (Authors' abstract, modified)

7488

Davis, R. C.

ELECTROMYOGRAPHIC FACTORS IN AIRCRAFT CONTROL: MUSCULAR ACTIVITY DURING STEADY NOISE AND ITS RELATION TO INSTRUCTED RESPONSES EVOKED BY VISUAL SIGNALS.—School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 55-126, Jan. 1957. 9 p. UNCLASSIFIED

Subjects were required to move a lever with a wrist motion to one side or the other (in response to specified visual signals), then immediately return it to center position. Measurements of muscle action potentials were made for extensor and flexor regions of both arms on 32 subjects under both noise (90 db.) and quiet conditions. Noise produced an increase in tension level in all locations and also influenced response time. (Author's abstract)

7489

Fletcher, J. L.

PURE-TONE THRESHOLDS FOLLOWING STIMULATION BY NARROW-BAND FILTERED NOISE.—Psychol. Monographs, 71 (4): 1-13. 1957.

DLC (BF1.P8, v. 71)

An experiment was conducted to test Hughes' concept of post-tetanic potentiation (a persistent increase in neural activity at a synapse following tetanic stimulation) as an explanation of auditory sensitization following stimulation. Auditory thresholds for tones at five frequencies from 100 to 600 c.p.s. were determined before and after stimulation for 4 minutes with broad-band noise or noise filtered from 100 to 600 c.p.s. Stimulation with unfiltered noise at 100 decibels was found to produce increased auditory thresholds, while stimulation with filtered noise lowered thresholds for tones within the filtered gap. Stimulation with 20 db. noise resulted in fatigue only at 100 and 600 c.p.s., and sensitization only at 350 c.p.s. Tinnitus was reported in some cases following stimulation at 100 db., and was generally of a higher frequency with unfiltered noise than with filtered noise. The results are opposite those that would be predicted on the basis of post-tetanic potentiation, since filtration increased auditory sensitivity despite a presumed decrease in tetanization.

7490

Gierke, H. E., von

AIRCRAFT NOISE CONTROL.—In: Handbook of noise control, p. 34-1 to 34-38. Ed. by C. M. Harris. New York: McGraw-Hill Book Co., 1957.

DLC (TA365.H3)

For assessing a noise situation, design criteria specifying human tolerance to noise exposure are considered, such as impairment of hearing, interference with performance and comfort, and arousal of annoyance. Discussion, figures, and charts are presented of noise measurements inside the airplane and around airports, noise control of ground and flight operations, and aircraft-engine test cells and run-up noise suppressors.

7491

Glekin, G. V.

[CHANGES IN DEGREE OF SYLLABLE ARTICULATION WHEN TABULAR MATTER IS READ OUT

REPEATEDLY UNDER NOISY AND SILENT CONDITIONS] Izmnenie protsenta artikulatsii slogov pod vlianiem povtornykh priemov tablits v usloviakh deistviia shuma i v tishine.—Biofizika (Moskva), 2 (4): 457-460. 1957. In Russian, with English summary (p. 460). DLC (QH505.A1B53, v. 2)

Repetition does not affect auditory acuity and speech discrimination thresholds under silent conditions or under noisy conditions. No clear-cut improvement was discerned with repetition of tables under noisy conditions, however under quiet conditions there was a distinct improvement. Training in perception of speech signals occurs under both quiet or noisy conditions, but the improvement is noticeable only under quiet test conditions.

7492

Goldman, D. E.

EFFECTS OF VIBRATION ON MAN.—In: Handbook of noise control, p. 11-1 to 11-20. Ed. by C. M. Harris. New York: McGraw-Hill Book Co., 1957.

DLC (TA365.H3)

The mechanical effect of vibration on the body is to produce motion and relative displacement. Large organs may pull on supporting ligaments and cause crushing injuries to soft tissues. Thermal effects are a direct consequence of absorption of vibrational energy. None have been observed at low frequencies but many at ultrasonic frequencies where animals may be heated to a point beyond their capacity to dissipate the heat, with consequent thermal death. Biological responses to vibration represent essentially a failure of the body to remain a passive system. Mechanical stimulation is detected by the auditory and vestibular systems, mechanical skin receptors, and internally located proprioceptors. Vibration can affect people's attitudes, feelings, and work performance. Major injuries resulting from vibrations are those of hearing loss from high-level noise and hand injury from the continued use of vibrating hand tools. A survey is presented of the human body as a dynamic mechanical system and of the effects of vibration on man and his various parts. Included are tables of the physical properties of the human body, acoustical properties of soft tissues, mechanical impedance of standing man for vertical vibration, mechanical impedance of surface of thigh, stomach, upper arm, and mastoid.

7493

Grognot, P.

[WHAT TO THINK OF THE EFFECT OF ULTRASONIC VIBRATIONS TRANSMITTED BY THE AIR]

Que faut-il penser de l'action des vibrations ultrasonores transmises par l'air?—Médecin d'usine (Paris), 19 (9): 627-632. Nov. 1957. In French, with English summary (p. 632). DNLM

Some workmen are exposed to an environment of ultrasonic vibrations with frequency spectra ranging between 20,000 and 60,000 hertz, and with ultrasonic intensities up to 115 decibels (db). The physiopathological effects of these vibrations appear after an hour's exposure when the intensity exceeds 95 db. Higher intensities produce eosinopenia or eosinophilia, according to the part of the body exposed, and a slight decrease in arterial pressure. Even higher intensities cause changes in the electroencephalogram, indicating a cerebral cortical reaction. Long and repeated exposures allow the body to become accustomed, if the intensity is near 95 db. Severe tissue injuries have been recorded in laboratory animals exposed to intensities of 170 db, an intensity not

yet detected in industry. Protection against ultrasonic vibrations may be obtained by interposition of an air stream with a thickness related to the ultrasonic frequency, or by the use of a screen (plexiglas, plywood, aluminum) several millimeters in thickness which can reduce these vibrations by 40-45 db.

7464

Gurovskii, N. N.

[THE EFFECT OF HELICOPTER MI-4 VIBRATIONS UPON THE LATENT PERIOD OF MOTOR REACTION OF THE PILOT] O vliianii vibratsii vertoleta Mi-4 na velichinu skrytogo perioda otvetnoi dvigatel'noi reaktsii letchika [Abstract]. — Voenno-meditsinskii zhurnal (Moskva), 1957 (7): 79. July 1957. In Russian. DLC (RC970.V55, v. 1957)

Thirty-four subjects were divided into 4 groups: (I) 5 men with flying experience as pilot-instructors (II) 9 students completing the flight course; (III) 10 controls (regular soldiers) and (IV) 10 flight theory students. All were subjected to successive exposures to vibrations. Groups I and II were tested by actual helicopter flights, the control group (III) was instructed how to react to vibrations, and Group IV was subjected to vibrations without actual flight. Flight fatigue produced a delayed response in Group I and II. Group III showed some improvement as a result of the training, while Group IV adapted itself well to the vibrations and reduced the reaction time in successive sessions. It is suggested that helicopter vibrations permit rapid adaptation of the organism to this condition.

7495

HANDBOOK OF NOISE CONTROL.—ix + [1014] p. Ed. by Cyril M. Harris. New York: McGraw-Hill Book Co., 1957. DLC (TA365.H3)

The chapters in this handbook are included in the following general groupings: properties of sound, effects of noise on man, vibration control, instrumentation and noise measurement, techniques of noise control, noise control in buildings, sources of noise and examples of noise control, noise control of machinery and electrical equipment, noise control in transportation, community noise, and the legal aspects of noise problems. Pertinent chapters are abstracted separately, see items no. 7482, 7490, 7492, 7496, 7511, 7515, 7521, 7525, 7905, 8027

7496

Hawley, M. E.,

and K. D. Kryter

EFFECTS OF NOISE ON SPEECH.—In: Handbook of noise control, p. 9-1 to 9-26. Ed. by C. M. Harris. New York: McGraw-Hill Book Co., 1957. DLC (TA365.H3, 1957)

A description is presented of the statistical properties of speech which are pertinent to intelligibility and methods of measuring speech intelligibility. The effectiveness of noise in masking speech is discussed, and it is shown that speech intelligibility can be predicted from physical measurements of the noise and of the equipment. Some equipment especially useful when intelligibility is a problem is described. Examples are given of speech-communication systems used in various noisy conditions. Included are various representative tables and charts. (93 references)

7497

Helper, M. M.

THE EFFECTS OF NOISE ON WORK OUTPUT AND PHYSIOLOGICAL ACTIVATION.—Army Medical Research Lab., Fort Knox, Ky. (USAMRL Project no. 6-95-20-001). Report no. 270, March 25, 1957. ii+25 p. AD 129 446 UNCLASSIFIED

Three physiological variables (skin conductance, pulse interval, and muscle tension) were recorded during performance of a mental task, during exposure to 110 db noise, and during the noise and task combined. Noise by itself was found to be relatively non-stressful. However, it appeared that noise added slightly to the physiological cost of mental work, even though noise did not affect task performance. No correlation was found between physiological reactions to noise and the effects of noise on performance. (Author's abstract)

7498

Hettinger, T.

[THE EFFECT OF VIBRATIONS ON MUSCULAR EFFICIENCY] Die Beeinflussung der muskulären Leistungsfähigkeit durch Erschütterungen.—Internationale Zeitschrift für angewandte Physiologie (Berlin), 16 (6): 500-511. 1957. In German. DNLN

It was shown in experiments with a vibratory device and hand ergometer that: (1) work on the vibratory apparatus results in a vascular reaction which affects subsequent performance on the ergometer; (2) the duration of vibratory work does not affect the intensity of the vascular reaction; (3) adaptation occurs; (4) this adaptation is seen as resulting from increased vascularization during work on the apparatus; (5) there are considerable individual differences in performance after vibration; (6) it is possible to estimate ergometric performance on basis of skin temperature on the back of the hand after vibration; (7) people with less reactive vascular systems are predisposed to development of pathological symptoms during work subjecting them to vibration; also their performance is lowered. (Author's summary, modified)

7499

Ireland, P. E.

THE IMPORTANCE OF NOISE HAZARDS.—Brit. Jour. Physical Med. and Indus. Hygiene (London), 20 (12): 275-80. Dec. 1957. DNLN

Aside from its effect on hearing, loud noise interferes with normal communications, task performance, has a psychic effect, and may completely destroy the normal human performance. Deafness, usually temporary, can be caused by exposure to noise with an overall intensity level in excess of 85 decibels. Years of exposure to noise with an intensity between 85 and 100 decibels may cause permanent deafness. Temporary deafness may be caused by shorter periods of exposure to noise with overall levels of from 100 to 130 decibels. Exposure to levels in excess of 140 decibels may result in extra-auditory effects such as vertigo, nausea, temporary blindness, fainting, etc. These symptoms disappear as soon as man is removed from the noisy environment. Consideration is given to hearing loss in industry, acoustic trauma due to concussion (war noises), the problem of assessing damage due to high noise levels in industry, and noise prevention criteria.

7500

Jaulmes

[NOISE AND ITS PHYSIO-PATHOLOGICAL CON-

SEQUENCES] Le bruit et ses conséquences physio-pathologiques. — Bulletin international des Services de santé des armées de terre de mer et de l'air (Liège), 30 (4): 139-145. April 1957. In French, with English summary (p. 139).

DLC (RC970.B77, v. 30)

Modern armies avail themselves of equipment whose complexity and power is continuously increasing the amount and the intensity of noise-sources. Through the air vibrations are transmitted whose frequencies extend themselves below (infra sounds) and above (ultra sounds) the frequencies which are heard as sounds; they exert a double action on the organism: namely locally on the auditive organ resulting after a shorter or longer period of time in definite lesions, and generally, in a complicated way which is still badly defined, in bringing forth at least an important amount of fatigue and decrease of energy. There are still many problems to be solved with regard to the selection of individuals who are hypersensitive to noises, and the protection of personnel against sonorous trauma either through weakening of the sources or through individual sound proofing. (Author's summary)

7501

Jerison, H. J.,

C. W. Crannell, and D. Pownall

ACOUSTIC NOISE AND REPEATED TIME JUDGMENTS IN A VISUAL MOVEMENT PROJECTION TASK.—Miami Univ., Oxford, Ohio (Contract no. AF 33(616)-2844); issued by Wright Air Development Center, Aero Medical Lab, Wright-Patterson Air Force Base, Ohio. (Project no. 7193-71614). WADC Technical Report no. 57-54, March 1957. v+26 p. AD 118 004 PB 135 915

Two hundred volunteer male students, working individually, were required to follow a moving target visually and to imagine the continuing movement of the target after it disappeared. When the target was believed to have reached a crosshair the subject squeezed a trigger. The task, which simulates radar observation of a target obscured by visual noise, was repeated ten times. It was found that a noise program in which it was quiet (78 decibels) during the visible portion of the target's course and noisy (110 decibels) when the target disappeared gave longer judgment times relative to those obtained under control conditions of quiet or noise throughout. The opposite program of "noise then quiet" was not differentiated from the control conditions. It was also found that judgment times became longer in succeeding trials under all four noise programs. (From the authors' abstract)

7502

Jerison, H. J.,

and R. A. Wallis

EXPERIMENTS ON VIGILANCE. III. PERFORMANCE ON A SIMPLE VIGILANCE TASK IN NOISE AND IN QUIET.—Antioch Coll., Yellow Springs, Ohio (Contract AF 33 (616)-3404); and Wright Air Development Center, Aero Medical Lab., Wright-Patterson Air Force Base, Ohio (Project no. 7193, Task no. 71614). WADC Technical Report no. 57-318, June 1957. iv+11 p. AD 118 337 PB 140 913

Twenty male undergraduate volunteers worked on a simple vigilance task (modified Mackworth Clock Test) without interruption for 1 3/4 hours in noise (112.5 db. SPL) and 1 3/4 hours in quiet (79 db. SPL). The performance function was the typical one

found in such tasks; performance dropped off rapidly after an initial high level. There was no differentiation, however, between performance in the noise session and in the quiet session. This result, which differs from previous results at this and at other laboratories on effects of noise on "vigilance", is explained on the basis of the absence of a need for flexibility of attention for performance on the simple vigilance task used here and the presence of such a need for performance on vigilance tasks in which an effect of noise was found. (Authors' abstract)

7503

Jerison, H. J.

PERFORMANCE ON A SIMPLE VIGILANCE TASK IN NOISE AND QUIET. — Jour. Acoust. Soc. Amer., 29 (11): 1163-1165. Nov. 1957.

DLC (QC221.A4, v. 29)

Twenty subjects, working individually, monitored a simple vigilance task, a modified "Mackworth Clock Test," for 1 3/4 hours in noise (112.5 decibels sound pressure level) and for 1 3/4 hours in quiet (79 decibels sound pressure level). No difference in efficiency attributable to noise level was found. This result is in conflict with previous reports from this and other laboratories which ascribed a decrement in performance on vigilance tasks to noise levels. Vigilance tasks in which performance decrements due to noise were found, differed from the present task in that they required subjects to scan a series of displays in addition to maintaining a vigil over each display. It is, therefore, suggested that flexibility of attention may be affected by noise, whereas vigilance without the requirement for flexibility may be unaffected. (Author's abstract)

7504

Jożkiewicz, S.

[BIOCHEMICAL CHANGES UNDER THE EFFECTS OF ULTRASOUNDS] Zmiany biochemiczne pod wpływem ultradźwięków. — Acta physiologica polonica (Warszawa), 8 (3-3a): 362-364. 1957. In Polish. DLC (QP1.A27, v. 8)

Ultrasounds of 30 minutes duration prevented discoloration of KMnO₄ in a 1:10,000 solution of catalase. Equally, there was no free HgCl₂ in the presence of catalase in a HgCl₂ solution.

7505

Koyanagi, T.,

and K. Takahashi

DECREASE OF THIAMINE IN THE BODY OF MICE BY STIMULATION OF SOUND.—Jour. Vitaminol. (Kyoto), 3 (4): 307-308. Dec. 10, 1957. DNLM

After three hours of exposure to sound (bell rung for 30 seconds at 5-minute intervals), mice were sacrificed by decapitation and the brain and carcass analyzed for thiamine. The thiamine concentration in the brain decreased remarkably in stimulated mice in comparison with control animals, whereas the concentration of the carcass showed an insignificant decrease.

7506

Krushinskii, L. V.,

and L. P. Dobrokhotova

[THE INFLUENCE OF THE THYROID GLAND ON THE MORTALITY RATE IN SHOCK-HEMORRHAGIC CONDITIONS CAUSED BY STRONG SOUND STIMULI] Vliianie shchitovidnoi zhelezy na chastotu smertei pri shokovogemorragicheskikh sostoianiiakh,

vyslyshaniykh sil'nymi zvukovymi rasdrazhiteliami. — *Biulleten' eksperimental'noi biologii i meditsiny* (Moskva), 44 (8): 46-49. Aug. 1957. In Russian, with English summary (p. 48-49).

DLC (R850.B55, v. 44)

Prolonged exposure (15-18 min.) of rats to strong sound stimulation by an electric bell causes a condition of excitement followed by a state of shock. In 12 to 15% of cases death ensues. Autopsy of these cases reveals brain hemorrhages which are the result of diapedesis. Lethality depends on the relationship between the excitation and inhibition processes and the functional condition of the endocrine system. The thyroid level exerts a distinct influence on the mortality of rats in the shock-hemorrhagic state. The mortality rate of rats with thyroid hyperfunction is 66.6%, while in thyroidectomized animals it falls below that of the controls (8.3%).

7507

Kuhn, H. A.

INDUSTRIAL NOISE PROBLEM.—*Medicina del trabajo* (Buenos Aires), 22 (172): 186-192. May 1957. In English. DNLN

There are many factors which influence the degree of hearing impairment present in noise deafness. The following are some of the more important considerations: (1) intensity and loudness of noise, (2) frequency spectrum of noise, (3) period of exposure, (4) individual susceptibility, (5) age of the subject, (6) co-existing ear disease, (7) character of surrounding in which noise is produced, and (8) the position of each ear with respect to sound waves. Mention is made of the characteristics of hearing loss and industrial hearing conservation programs.

7508

Lebedeva, A. F.

[GAS EXCHANGE DURING GENERAL VIBRATION] Gazoobmen pri obshchei vibratsii. — *Gigiena truda i professional'nye zabolevaniia* (Moskva), 1 (1): 45-50. Jan.-Feb. 1957. In Russian. DNLN

Gaseous metabolism was increased by about 25% in white male rats exposed to vibrations for 10 minutes. The author suggests that the increase was due to increased muscular activity induced by a wave of continuous impulses from the central nervous system. As the vibrations continued, loss of orientation, lessening of neural activity, and decrease of gas exchange were observed.

7509

Loeb, M.

THE INFLUENCE OF INTENSE NOISE ON PERFORMANCE OF A PRECISE FATIGUING TASK.—Army Medical Research Lab., Fort Knox, Ky. (USAMRL Project no. 6-95-20-001, Subtask S-3). Report no. 268, April 5, 1957. ii+10 p. AD 126 845 UNCLASSIFIED

Ten subjects were required to perform a fatiguing task (controlled rowing) in accordance with several criteria before, during, and after 3 experimental conditions. The conditions involved 115-decibel continuous broad band noise, 115-decibel randomly interrupted noise and 50-decibel ambient noise (control exposure). One of the subject's criterion of performance was more ambiguous—less clearly defined—than the others. None of the measures changed appreciably as a result of exposure to noise. Some temporal changes, possibly indicative of fatigue, were noteworthy. (From the author's summary and conclusions)

7510

Love, T. M.

JET NOISE.—*Skyways*, 16 (8): 10-11, 36. June 1957. DLC (TL501.S634, v. 16)

The fundamental characteristics of jet engine noise are identified and noise reduction methods are investigated. Jet engine noise reduction is needed during ground maintenance and runup operations and during actual flight operations. Various methods discussed which might help to solve this problem include: (1) the selection of engine runup areas which would cause the least disturbance to populated areas of the airport and the community; (2) the use of engine mufflers and noise reducers; and (3) the use of a specially designed nose-gear tug (remotely controlled by the pilot) to take the transport from the terminal gate to the runup area adjacent to the actual runway. If all aspects are considered and met, jet aircraft operations will become as normal as propeller aircraft. However, jet pilots and ground crews will have to exercise more consideration in their flying and maintenance operations if they want to avoid complaints.

7511

Lucey, K. J.

LEGAL ASPECTS OF THE AIRPLANE NOISE PROBLEM.—In: *Handbook of noise control*, p. 37-1 to 37-14. Ed. by C. M. Harris. New York: McGraw-Hill Book Co., 1957. DLC (TA365.H3)

The noise of an aircraft engine being tested, or during warm-up preparatory to flight, present the same legal problems as the noise emanating from any industrial establishment. The legal effects of personal injury to airplane ground or flight crew from intense noise exposure is treated similar to industrial workmen's compensation. Airplane flight over private property, however, has created complex legal problems. During take-off and landing operations, the nuisance factor of noise creates a situation that results in conflict between the legal rights of the airplane and the property owner. In an attempt to understand the rights of aircraft flying over private property discussion is presented on the following topics: rights of surface owners, rights of aircraft, approach-zone noise, and zoning problems.

7512

McCroskey, R. L.

A RESEARCH NOTE ON THE EFFECT OF NOISE UPON FLICKER FUSION FREQUENCY.—Ohio State Univ. Research Foundation, Columbus (Contract N6 ONR 22525); and Naval School of Aviation Medicine, Pensacola, Fla. (Project no. NM 18 02 99, Subtask 1). Joint Project Report no. 70, July 1, 1957. ii+6 p. AD 154 616 UNCLASSIFIED

The criterion measure for the experimental conditions (noise and quiet) was the mean flicker fusion frequency obtained under each condition for each subject. An analysis of the data indicates that: (1) the flicker fusion frequency was significantly lowered when judgments were made in an environment of noise; and (2) the effect of noise upon the flicker fusion frequency was temporary; following the cessation of noise, the fusion frequency returned to the pre-noise level. (Authors' conclusions)

7513

Miller, I.

PERCEPTION OF NONSENSE PASSAGES IN RELATION TO AMOUNT OF INFORMATION AND

SPEECH-TO-NOISE RATIO. — Jour. Exper. Psychol., 53 (6): 388-393. June 1957.

DLC (BF1.J6, v. 53)

Perception of previously-learned nonsense passages presented at rates of 1 to 4 bits/item was determined at signal/noise (S/N) ratios ranging from -13 to +8 decibels. A progressive decrease in the percentage of items correctly perceived was found as the number of bits/item was increased, and as the S/N ratio was decreased. Number of bits/item interacted significantly with S/N ratios, so that differences associated with bits/item increased as the S/N ratio decreased. Information transmitted was increased at all S/N ratios with increases in bits/item, but the percentage of items correct was decreased.

7514

Neeley, K. K.

NOISE: SOME IMPLICATIONS FOR AVIATION. — Canad. Aeronaut. Jour., 3 (9): 312-317. Nov. 1957.

DLC (TL501.C2713, v. 3)

Noise has become one of the important problems in aviation. Its effects on hearing, voice communications, and man's ability to perform certain tasks, are becoming more and more pronounced. Criteria and regulations for the protection of personnel from high intensity noise have to be initiated and implemented. Similarly criteria and procedures have to be formulated and used to minimize the decrease in efficiency with which man can communicate and work in high intensity noise areas. Suggestions are outlined that will aid the airport operators to attenuate and control high intensity noise which may result in an increase in the efficiency of airport operations. (Author's summary)

7515

Parrack, H. O.

COMMUNITY REACTION TO NOISE. — In: Handbook of noise control, p. 36-1 to 36-20. Ed. by C. M. Harris. New York: McGraw-Hill Book Co., 1957.

DLC (TA365.H3, 1957)

Requirements for a method of predicting community response to noise (general community planning, zoning, operational guidance) are described together with suggested uses for the predictive method. Annoyance appears to be the most complex response of individuals to a noise-stimulus situation. Interference with rest, relaxation, and sleep was an important generator of annoyance. Traffic noise created interferences to a larger number of persons than did aircraft noise. Interference with the detection of a spoken signal (voice) was of major importance with respect to aircraft noise but of less importance with regard to traffic noise. Fear, in the case of aircraft operations, appears to be a factor in creating annoyance. Tables are included of the perception of aircraft noise as related to the degree of annoyance.

7516

Paterson, A. R.

WHEN IS AN AIRCRAFT A NUISANCE IN THE EYES OF THE LAW? — Canad. Aeronaut. Jour. (Ottawa), 3 (10): 336-340. Dec. 1957.

DLC (TL501.C2713, v. 3)

The law of nuisance is discussed as it may affect the operation of aircraft in Canada, the United States, and the United Kingdom. Of these, only the British seem so far to have attempted to tackle the problem directly. This is done by having the Minister of

Transport and Civil Aviation attempt to hold a balance between public and private interest. Certain regulations laid down by the Minister affecting noise and vibration caused by aircraft during takeoff and landing, moving on the ground or on water, and during operation of the engine for testing, preparation for or at the end of flight are presented. The merit of the adoption of the British method by others is discussed.

7517

Philmus, L. C.

FACTS BELIE WILD CHARGES OF JET DEAFNESS. — Amer. Aviation, 20 (20): 29-30. Feb. 25, 1957.

DLC (TL501.A675, v. 20)

Evidence is presented refuting the charge that jet noise is chiefly responsible for the \$54 million paid by the Veterans Administration for hearing loss and ear diseases. Most of the payments for all hearing damage cases was for disabilities incurred in the pre-jet era. The \$54 million figure was first used to press the importance for implementing a regulation requiring that audiometric hearing tests be made mandatory for all military services. At no time was the assumption made that the hearing losses were caused by jet noise. The mandatory hearing conservation program now in operation is described. It requires an initial audiogram to measure hearing capability of personnel prior to assignment to hazardous noise-exposure duty. The mandatory audiogram will provide the first accurate yardstick for measuring and evaluating losses and allow an analysis of their cause. It is hoped that audiograms will eventually be given to all military and civilian personnel regardless of assignment.

7518

Pickett, J. M.

THE LIMITS OF UNAIDED SPEECH COMMUNICATION IN INTENSE NOISE [Abstract]. — Amer. Psychologist, 12 (7): 447. July 1957.

DLC (BF1.A55, v. 12)

Person-to-person speech communication tests were conducted with three noise spectra at high noise levels. Vocal output was found to increase 8 decibels with an increase in noise level of 30 db. The speech of louder talkers was somewhat more intelligible, but was not consistent with their higher output level. It is conservatively estimated that at a distance of one meter, speech communication is satisfactory at a maximum noise level of 95 db. with white noise, and 105 db. with low-frequency noise.

7519

Richards, E. J.

NOISE RESEARCH IN THE UNITED KINGDOM. — Canad. Aeronaut. Jour. (Ottawa), 3 (10): 341-357. Dec. 1957.

DLC (TL501.C2713, v. 3)

Research being carried out on the noise problem in the United Kingdom is described and includes the following aspects: (1) the establishment of the problem, (2) the study of jet noise at source, (3) the suppression of jet noise, (4) the effects of noise on structures, (5) boundary layer noise, and (6) propeller and helicopter noise. Other noise researches not specifically related to aeronautical applications are not included. The noise program is not sufficient although it is as much as the country can afford. The greatest outcome of all has been the gradual emerging of a body of people competent in this new and all-embracing field of science who can tackle the problems as

they become really serious, a state of affairs which can only be a year or two away. (48 references)

7520

Robert, P.,

P. Burgeat, and J. Vertut

[SOUND INJURY AND THE MIDDLE EAR] Traumatisme sonore et oreille moyenne.—Médecine aéronautique (Paris), 12 (4): 353-355. 1957. In French, with English summary (p. 355).

DLC (TL555.M394, v. 12)

The effects of noise on hearing was studied clinically and audiometrically in 116 pilot students having just completed one year of training. Out of 62 ears with previous middle-ear damage in the range of deep sounds (-15 decibels or more for a frequency of 200 or 500 cycles, or both), 17 demonstrated noise injury. Fifty-five ears with no previous damage showed 35 cases with cochlear injury. It appears that previous noise damage to the middle ear plays a part in delaying the appearance of auditory scotoma for sharp sounds, rather than in preventing it.

7521

Rudmose, W.

HEARING LOSS RESULTING FROM NOISE EXPOSURE.—In: Handbook of noise control, p. 7-1 to 7-22. Ed. by C. M. Harris. New York: McGraw-Hill Book Co., 1957. DLC (TA365.H3)

The average audiogram resulting from noise exposure shows the least permanent loss of hearing at frequencies below 1000 c.p.s. Hearing losses increase for frequencies above 1000 c.p.s., reaching a maximum at approximately 4000 c.p.s. Temporary threshold shifts are greatest for normal hearing and may approach 15 decibels (db.) for exposures to noises with octave levels of 100 db. If appreciable hearing loss exists, temporary threshold shifts are generally less than 5 db. for frequencies below 2000 c.p.s. if the noise octave sound pressure level is less than 100 db. For cases of continuous exposure to steady noises, 20% of employees showed hearing losses in excess of two times the average hearing loss of the group. Speech reception loss is the principal guide in evaluating the seriousness of a hearing loss. Included are representative graphs of presbycusis curves, hearing loss after continuous exposure to steady noise, distribution of hearing losses, pure-tone hearing loss related to speech loss, intermittent exposure to steady noise of airline pilots, etc.

7522

*Ruff, S.

[AIRPLANE NOISE AND HEALTH] Fluglärm und Gesundheit.—In: Donat, J. and F. von Tischendorf, Lärmprobleme der Gegenwart (Vol. 4 of the Schriftenreihe zur Lärmbekämpfung, issued by the Deutscher Arbeitsring für Lärmbekämpfung, Düsseldorf). Alfeld/Leine: Gildeverlag Hans-Gerhard Dobler, 1957.

7523

Sakamoto, H.

STUDIES ON THE MECHANISM OF ADAPTATION IN ORGANISMS EXPOSED TO NOISE, WITH SPECIAL REFERENCE TO THE REACTION OF THE PITUITARY-ADRENOCORTICAL SYSTEM. IV. FURTHER ATTEMPTS TO DETERMINE THE REGIONS SUFFERING FROM DISTURBANCES OWING TO NOISES.—Jour. Sci. and Labour (Tokyo), 23 (5): 308-311. May 1957. In Japanese, with English summary (p. 308). DNLM

Previous reports have indicated that decreased urinary 17-ketosteroid excretion is found in persons exposed to noise and attributed to the decreased stimulation of ACTH on the adrenal cortex. In addition, on exposure to noise, considerable inclination towards sympathicotonia and increased adrenaline secretion were demonstrated, indicating the occurrence of the so-called "emergency reaction". Under normal conditions increased adrenaline secretion is accompanied by strong adrenocortical secretion. This does not occur in subjects exposed to noise. The adrenal cortex remains inactive. It is concluded that noise produces some disturbances in the diencephalo-pituitary system. (Author's summary, modified)

7524

Smith, Robert B.,

and F. W. Snyder

PRELIMINARY STUDY OF AIRCREW TOLERANCE TO LOW-FREQUENCY VERTICAL VIBRATION.—Boeing Airplane Co., Wichita, Kansas (Contract no. AF34(601)-2975). Document no. D3-1189, July 3, 1957. iii+32 p. AD 155 462 UNCLASSIFIED

Five aircrewmembers were subjected to vertical harmonic motions of frequencies ranging from 3 to 30 c.p.s. with input accelerations ranging to a maximum of over 2.5 g. The subjective judgments of the effect of the vibrations on the aircrewmembers were reported by them in terms of a 5-point scale. The results of the subjective judgment tests indicate that aircrewmembers are able to tolerate unexpectedly high levels of vibratory acceleration for relatively short periods at the frequencies explored. Transmissibility of vibration from supporting structure adjoining the seat to just under the body of the seated airman varied with frequency. Generally, the higher frequencies were transmitted with a greater loss in amplitude of vibration (or g's) than were the lower frequencies. The same aircrewmembers performed a tracking task while being subjected to vibration of various amplitudes and frequencies. The magnitude and duration of error in tracking was electrically integrated to produce a comparable score for each vibration condition. It was tentatively found that there were statistically significant decrements in performance under vibration conditions which were judged to be nearly "intolerable". In addition, there were some notable individual differences in response to the various vibration conditions. (From the authors' summary)

7525

Stevens, K. N.,

and J. J. Baruch

COMMUNITY NOISE AND CITY PLANNING.—In: Handbook of noise control, p. 35-1 to 35-17. Ed. by C. M. Harris. New York: McGraw-Hill Book Co., 1957. DLC (TA365.H3)

People living in residential communities are exposed to noise originating from industry, automobiles, trains, airplanes, etc. With regard to aircraft, the sound pressure levels measured a fixed distance underneath aircraft in flight depend markedly on the type of aircraft and on the operating conditions or power settings of the engines. Some typical measurements of peak sound-pressure levels underneath various types of aircraft under several operating conditions are given. Discussion is presented on determination of community noise from statistical properties of noise sources, noise and community

planning, and zoning articles. Included are various tables and charts.

7526

Strollo, M.,

and F. O. Debarnot

[EFFECT OF NOISE PRODUCED IN FLIGHT ON THE SPEED AND CONSTANCY OF MOTOR REACTIONS]

Influenza del rumore, prodotto in volo, sulla prontezza e costanza della reazione motoria.—*Rivista di medicina aeronautica* (Roma), 20 (4): 601-609. Oct.-Dec. 1957. In Italian, with English summary (p. 607).

DLC (RC1050.R56, v. 20)

Ten subjects of a mean age of 34 years performed repeated simple reaction-time tests under normal conditions. In a second experiment these subjects performed the same tests while listening, via ear-phones, to a tape-recorded reproduction of the noise existing under a pilot's helmet during normal jet-plane flight. The results clearly showed different data in the two tests for both speed and constancy of motor reactions. Noise decreased the efficiency of simple tasks, extended the reaction time, and affected the rapidity and constancy of motor reactions. These effects may be responsible for some unexplained aircraft accidents and permit more extensive considerations on the mastering of high-speed modern aircraft.

7527

Tsutahiko, N.

[INFLUENCE OF VEHICLE VIBRATION ON THE PASSAGE OF STOMACH CONTENTS].—*Japanese Safety Forces Med. Jour.* (Tokyo), 4 (4): 15-17. April 1957. In Japanese, with English abstract (p. 2). DNLM

Abdominal photofluorograms of 46 men taken one, two, and three hours after a ride on a rough road to simulate extreme vibration showed an increase in the rate of passage of stomach contents in 22 subjects. Ten subjects at rest showed a faster passage of stomach contents, and in 14 cases there was no significant change in the rate of passage between subjects at rest or during vibration. (Author's abstract, modified)

7528

Wajda, K.

[CHRONAXIMETRIC INVESTIGATIONS OF MOTOR EXCITABILITY IN TRACTOR DRIVERS] Chronaksymetryczne badania pobudliwości ruchowej u traktorzystów.—*Acta physiologica polonica* (Warszawa), 8 (3-3a): 594. 1957. In Polish.

DLC (QP1.A27, v. 8)

The rheobase in tractor drivers was not altered, but the chronaxy was increased in 68% of all tested. In addition, the fatigue due to muscular work and to the vibrations sustained produced pain in the chest, abdomen, back, and extremities, increased the blood pressure, decreased muscular resistance, and produced slight edema of the neck and the extremities. In the opinion of the author this is due to disturbances of the central nervous system.

h. Physical Work

7529

Acheson, E. D.

THE ELECTROCARDIOGRAM AFTER EXERCISE IN THE DETECTION OF LATENT CORONARY-ARTERY DISEASE IN R.A.F. PERSONNEL.—*Lancet* (London), 272 (6958): 26-27. Jan. 5, 1957.

DLC (R31.L3, v. 272)

Electrocardiograms (ECG) were taken for 540 clinically healthy male R.A.F. personnel between the ages of 19 and 54 after an effort test which consisted of running down and up a staircase of 86 steps. Men over 50 years of age and 47 men between 40 and 50 years performed a single trip; all others performed two successive trips. The post-exercise ECG's were normal in 473 subjects. Of the remaining 67 subjects 11 had normal ECG's in a retest after several weeks; the rest showed a consistent deviation from the usual electrocardiographic response to exercise.

7530

Asmussen, E.,

and M. Nielsen

MEASUREMENT OF ARTERIAL pO_2 IN LIGHT AND HEAVY EXERCISE [Abstract].—*Scandinavian Physiological Congress, IX* (Stockholm, August 26-29, 1957), Abstracts of Communications. *Acta physiologica scandinavica* (Stockholm), 42 (supplement 145): 17. 1957. In English. DNLM

In two series of experiments, one involving light (O_2 uptake 1.8 liter/min.) and one heavy work (O_2 uptake 3.3 l./min.), undertaken with young men the arterial oxygen tension was 84 mm. Hg and 86 mm. Hg, respectively. These findings do not support the assertion that arterial oxygen hypotension is more severe in heavy work than in light work.

7531

Auvergnat, R.

[VARIATION OF THE SERUM PROTEIN AND ELECTROLYTE LEVEL DURING MUSCULAR WORK]

Variation du taux sérique des protéines et des électrolytes au cours du travail musculaire.—*Journal de physiologie* (Paris), 49 (1): 29-33. Jan.-March 1957. In French. DNLM

During muscular exercise for 1-1/2 minutes, blood protein and electrolyte levels were significantly elevated. The essential mechanism producing these changes in the blood during effort is complex. Factors possibly responsible include: the loss of water by the respiratory tract, cutaneous loss of water and salts, and exchange of water and crystalloids between plasma and erythrocytes. Included are the tabulated changes in blood protein and electrolyte values during exercise.

7532

Bárdoš, G.,

L. Komadel, and A. Kreze

[THE PHYSIOLOGICAL ENLARGEMENT OF THE HEART. III. ROENTGENOGRAPHIC DIMENSIONS] O fyziologickom zväčšení srdca. III. Skiagrafické rozmery.—*Bratislavské lekárske listy* (Bratislava), 37 (pt. 1, no. 3): 129-140. 1957. In Slovak, with English summary (p. 139). DNLM

Longitudinal and transversal diameters of the heart shadow on roentgenograms were measured in 336 male athletes. The values were compared with the normal values of 11.0-16.0 cm. for the longitudinal diameter, and 10.0-15.0 cm. for the transversal diameter. The upper limit of the normal range for longitudinal dimension was exceeded by one third of the subjects. Enlargement of the heart in transversal direction was less common and exceeded the upper norm only in 6.6% of subjects. This enlargement of the heart at rest in athletes is considered by the authors to be physiologic in nature. (From the authors' summary)

7533

Bárdoš, G.,

L. Komadel, and A. Kreze

[THE PHYSIOLOGICAL ENLARGEMENT OF THE HEART. IV. THE VEGETATIVE TONUS IN THE ELECTROCARDIOGRAPHIC PATTERN OF ATHLETES] O fyziologickom zväčšení srdca. IV. O vegetatívnom tóne v elektrokardiografickom obraze športovcov.—Bratislavské lekárske listy (Bratislava), 37 (pt. 1, no. 8): 449-463. 1957. In Slovak, with English summary (p. 462). DNLM

The authors evaluated 608 electrocardiographic tracings of top athletes from 15 European countries with regard to the occurrence of vagotonia. They determined the vegetative tonus on the basis of four characteristics: rate, P wave, P-Q interval, and T wave in the 2nd lead. Individual signs were most frequently found in a state of equilibrium with more deviation to the parasympathetic than to the sympathetic side. General parasympathictonia (total general vegetative vagus tonus) was found in 48.6% of the male and 29.3% of the female athletes. Before start there was a shift of the autonomic equilibrium towards the sympathetic side, which is regarded as a conditional reflex reaction to the circumstance of the competition. (Authors' summary, modified)

7534

Bauer, A. C.,

1957

E. R. Vanderhoof, and C. J. Imig

EFFECT OF DIFFERENT PATTERNS OF LOCAL EXERCISE ON PERIPHERAL BLOOD FLOW [Abstract].—Federation Proceedings, 16 (1, part I): 8. March 1957. DLC (QH301.F37, v. 16)

During an isometric handgrip of low intensity the blood flow in the forearm was greater than the pre-exercise level of flow. During more intense handgrips the blood flow was less than the pre-exercise flow. The amount of decreased blood flow varied directly with the intensity of the exercise. The amount of post-exercise hyperemia also varied directly with the intensity of the exercise. The effect of local exercise on blood flow is determined by the type, intensity and duration of the exercise employed. (From the authors' abstract)

7535

Bober, S.

[EFFORT BALLISTOCARDIOGRAM IN CYCLISTS] Balistokardiogram wysiłkowy u kolarzy.—Polski tygodnik lekarski (Warszawa), 12 (22): 826-830. May 27, 1957. In Polish, with English summary (p. 830). DNLM

Four types of ballistocardiograms after physical work were established: (1) with inconsiderable initial enlargement of I, J, K deflections and rapid return to initial values or with an almost flat curve; (2) with an enlargement of I, J, K deflections lasting for a longer time (1-12 minutes); (3) with a constant although slow lowering of I, J, K deflections after effort; and (4) with considerable lowering of I, J, K deflections after effort, persisting for a long time (up to 17 minutes). Ballistocardiographic curves of well-trained cyclists corresponded to the first 3 types. It appears that Type 1 of the curve corresponds to good training according to electrocardiographic (ECG) characteristics. A deformed ballistocardiogram found in sportsmen with normal ECG is proof of certain circulatory disorders. It was found that the time of return of the circulatory system to normal after effort in well trained sportsmen is considerably longer than the 2-3 minutes which have been accepted

as the norm in sports physiology. (Author's summary, modified)

7536

Bojanovský, I.,

and J. Filip

[THE EFFECT OF EXHAUSTING PHYSICAL EFFORT ON THE LEVEL AND COMPOSITION OF PROTEINS IN THE BLOOD SERUM OF ATHLETES IN TRAINING] Vliv vyčerpávající dávkované tělesné námahy na hladinu a složení bílkoviny séra krevního u trenovaných sportovců.—Časopis lékařů českých (Praha), 96 (2): 52-55. Jan. 11, 1957. In Czech, with English summary (p. 55). DNLM

Ten athletes at the peak of their training performed work on a bicycle ergometer at 23 kg./sec. for 10 minutes. The levels of total serum proteins, their fractions, and hematocrit were measured before and after work. Total serum protein and hematocrit levels rose markedly, while the protein fractions did not exhibit a significant change. In the majority of cases the relative increase in serum proteins was less than the increase in hematocrit, which may be explained probably by an increased capillary permeability after work and a small loss of protein to the extravascular spaces. (Authors' summary, modified)

7537

Brouha, L.,

and M. E. Harrington

HEART RATE AND BLOOD PRESSURE REACTIONS OF MEN AND WOMEN DURING AND AFTER MUSCULAR EXERCISE.—Jour. Lancet, 77 (3): 79-80. March 1957. DLC (R11.J57, v. 77)

Four women and four men were tested at various work loads under similar environmental conditions. For light exercise (360 kilogram-meters per minute) women maintained a lower systolic blood pressure and a lower pulse pressure than men. Their maximum heart rate was higher than that of the men. Recovery from exercise was similar in both sexes for blood pressure and heart rate. For heavier exercise (540-720 kilogram-meters per minute), systolic pressure and pulse pressure reached practically the same level in both sexes. Blood pressure recovery after exercise was similar for both sexes, but heart rate recovery to pre-exercise level was slower in women than in men. For loads of 540 kilogram-meters or more per minute, the pulse rate was a discriminating factor between the sexes during exercise, whereas blood pressure was not. Body temperature changes were found to be insignificant in both sexes.

7538

Brown, Frank J.

BALLISTOCARDIOGRAPHIC STUDY OF MARATHON RUNNERS.—Jour. Lancet, 77 (3): 89-90. March 1957. DLC (R11.J57, v. 77)

Analysis of 41 runners on whom ballistocardiograms were made indicated no pronounced detrimental effects on the heart of running 26 miles. Due to their sensitivity, ballistocardiograms are not considered satisfactory screening tests for marathon runners.

7539

Bühler, A.

[CIRCULATION STUDIES IN HIGH MOUNTAINS] Kreislaufstudien im Hochgebirge.—Praxis (Bern), 46 (51): 1131-1133. Dec. 19, 1957. In German. DNLM

Comparative investigations of pulse rate and blood pressure were carried out by a sphygmotonomograph during a longer military station in the Gotthardt region. During a climb to Pizzo Centrale from Airolo (altitude difference approximately 2000 m.) the pulse rate doubled in the three participants, with a recovery time of approximately 1 hour. The blood pressure rose by 14%. One subject who was a trained alpine guide did not show any elevation of blood pressure. In a passive ascent to Gotthardt hostel (approximately 1000 m. altitude difference), the pulse rate did not change and blood pressure fell 15%. The increased circulatory system function after a strenuous mountain climb manifested in the higher pulse rate and blood pressure, is therefore essentially a product of physical work and not of altitude.

7540

Bugge-Asperheim, B.,
and K. L. Andersen
REDUCTION IN CO₂ STORES OF MAN DUE TO MUSCULAR EXERCISE [Abstract].—*Acta physiologica scandinavica* (Stockholm), 42, Supplement 145: 27. 1957. In English. DNLN

After riding the bicycle with a 1500 kg. load for 1 minute, the lactic acid in the blood increases. The increase is succeeded by a hyperexcretion of CO₂ in the amount of 1-2% of the total CO₂ stores of the body within the first minutes of recovery. There is no or only a slight tendency to CO₂ retention.

7541

Capone, C.
and A. Venerando
[TONE AND EXCITABILITY OF THE VEGETATIVE NERVOUS SYSTEM IN PHYSICAL WORK] Tono ed eccitabilità del sistema nervoso vegetativo nel lavoro fisico.—*Folia medica* (Napoli), 40 (3): 197-205. March 1957. In Italian, with English summary (p. 204). DNLN

A survey of the neurovegetative system was made in 15 regularly trained boat rowers during three years of physical activity by means of Pfister's modified orthoclinostatic method. The results show that the tone of each section of the neuro-vegetative system remains constant and that training modifies and amends only neurovegetative excitability. For these reasons it is believed that some cardiovascular changes usually found in trained persons, especially bradycardia, are independent of vagal influence, insofar as a predominance of the vegetative section is concerned and must rather be correlated with various cortical factors. (Authors' summary, modified)

7542

Cureton, T. K.
POSTEXERCISE BLOOD PRESSURES IN MAXIMUM EXERTION TESTS AND RELATIONSHIPS TO PERFORMANCE TIME, OXYGEN INTAKE AND OXYGEN DEBT, AND PERIPHERAL RESISTANCE.—*Jour. Lancet*, 77 (3): 81-82. March 1957. DLC (R11.J57, v. 77)

Men in top cardiovascular condition for strenuous athletic performance adjust to the stress by developing large pulse pressures, but the post-effort diastolic pressure usually drops rather than rises, indicating quick lowering of the peripheral resistance during the effort. Men in poor cardiovascular condition for strenuous athletic effort do not adjust well to the stress, indicated by relatively high blood pressures after an all-out step test or treadmill run.

Such inability to adjust is undoubtedly associated with relatively high peripheral resistance during the stress. Experimental work shows the possibility of reducing the peripheral resistance and diastolic blood pressures by physical training over several months. (Author's conclusions, modified)

7543

De Nayer, J.
and M. Ostyn
[PHYSICAL EFFORT AND ADAPTATION OF THE ADRENAL GLANDS] Lichamelijk inspanning en adaptatie der bijnieren.—*Acta belgica de arte medicinali et pharmaceutica militari* (Bruxelles), 110 (3): 373-381. Oct. 1957. In Dutch, with English summary (p. 380). DNLN

Eosinopenia (56% of the initial value) which appears after physical effort (step test) is compared with that appearing after an injection of 0.4 mg. of adrenaline (61% of the initial value). The step test induces an immediate and marked increase in the urinary excretion of corticoids in trained subjects and an initial decrease followed by a slow increase towards normal values in untrained subjects. Reviewed are problems relating to the significance of these results in athletes during training and the concept of physical exertion as a stress factor. (Authors' summary, modified) (44 references)

7544

Denolin, H.
[PULMONARY FUNCTION DURING EFFORT] La fonction pulmonaire au cours de l'effort.—*Acta belgica de arte medicinali et pharmaceutica militari* (Bruxelles), 110 (4): 521-572. Dec. 1957. In French, with English summary (p. 563-4). DNLN

A review is presented of pulmonary physiology and its adaptation to physical exertion. Consideration is given to the following points: (1) pulmonary ventilation and its relation to the mechanical characteristics of the lung and thorax; (2) internal ventilation, distribution of inhaled air, physiological dead space, and alveolar ventilation; (3) respiratory exchange (oxygen consumption, carbon dioxide output) and its relation to intense exercise and ventilation and during work after exertion (oxygen debt); (4) diffusion of respiratory gases through the alveolar membrane; and (5) pulmonary circulation, blood output and its regulation, intrapulmonary blood volume, intravascular pulmonary pressure and their adaptation during exercise. (143 references)

7545

Erikson, H.
THE RESPIRATORY GASEOUS EXCHANGE AFTER A SHORT BURST OF EXERCISE.—*Acta physiologica scandinavica* (Stockholm), 40 (2-3): 182-195. 1957. In English. DNLN

Spirometric investigations of the respiratory gaseous exchange during resting (not basal) conditions and the recovery after a 70-yard sprint are reported. It is shown that about 10 minutes after connection with the spirometer fairly constant values for oxygen uptake and carbon dioxide output were obtained. These resting values were regained shortly after the exercise. The time used for elimination of excess carbon dioxide was longer and more constant, and showed greater interindividual differences than the time required for covering the oxygen debt. Well-trained subjects with good results in track competitions showed the shortest recovery times. Trained subjects with fair to poor results had recovery times

overlapping the recovery times of untrained subjects in good physical condition. (Author's summary)

7546

Erikson, H.

THE RESPIRATORY RESPONSE TO ACUTE EXERCISE OF ESKIMOS AND WHITES [Abstract].—*Acta physiologica scandinavica* (Stockholm), 42, Supplementum 145: 40. 1957. In English. DNLM

The respiratory gaseous exchange was compared for 10 Alaskan male Eskimos and 10 white male subjects during rest, during work on a bicycle ergometer with a load of 1125 kg. in the course of 1 minute, and after work. The Eskimos who were shorter and lighter than white subjects had a shorter recovery time, which is indicative of better cardio-respiratory function.

7547

Frič, J.

[MEASUREMENTS OF CIRCULATION TIME (LUNG-EAR) BY MEANS OF AN OXYHEMOMETER] Výsledky měření oběhových dob (plíce-ucho) pomocí oxymetru.—*Teorie a praxe tělesné výchovy a sportu* (Praha), 5 (4): 235-243. 1957. In Czech, with English summary (p. 243). DLC (GV201.T38, v. 5)

Small-size oxymeters which fit into the ear were developed for the measurement of the lung-ear circulation time. The application of this instrument to the training and racing of cyclists shows that the longer resting lung-ear circulation time while relaxing before a race is a sign of a good training condition. Fatigue in a certain number of bicycle racers was indicated by shortened circulation time after a temporary lengthening.

7548

Geuens

[CONTRIBUTION TO THE STUDY OF CHANGES OF BLOOD CELLS AT REST AND AFTER EFFORT] Contribution à l'étude des modifications des éléments figurés du sang au repos et après effort.—*Acta belgica de arte medicinali et pharmaceutica militari* (Bruxelles), 110 (3): 353-362. Oct. 1957. In French, with English summary (p. 362). DNLM

Measurements were made of the changes in metabolism and in blood cells of 14 subjects at rest for one day followed by a period of physical activity (cycloergometry) for 20 minutes. Basal metabolism at rest was found to change in relation to digestive function, with an over-all range of 25.1%. The rate was highest after meals and at noon. Results of the metabolic variations during effort were incomplete, but an over-all increase is indicated. Changes in the number of erythrocytes and leukocytes were also related to digestion. Work produced a relative increase in erythrocytes (22%), which returned to normal values after 5 hours. Leukocytes showed an increase (34%) which slowly returned to normal. An increase was found also in the lymphocytes during work and in the neutrophils during the recuperative period.

7549

Gonțea, I.,

P. Șuțescu, and J. Pereteanu

[THE NEED OF VITAMIN C IN MEN DURING WORK AT HIGH TEMPERATURES] Cercetări asupra trebuințelor în vitamina C ale omului în muncă la temperaturi înalte.—*Studii și cercetări de fiziologie* (București), 2 (1-2): 151-160. 1957. In Rumanian, with French summary (p. 159). DLC (QP1.A2, v. 2)

The effect of high temperature (35° C.) on the ascorbic acid content of plasma, urine, and sweat was studied in 9 men between 20-24 years of age performing work on a cycloergometer for four hours (six times for twenty minutes at 700 kg./minute). A decrease of 13% in the plasma ascorbic acid was found, and a 27% increase in ascorbinuria. Sweat ascorbic acid content varied individually between 1.15 and 4.83 mg. Intensive work (84,000 kg.-m. during four hours) resulted in a loss of 6.5 mg. ascorbic acid by transpiration. Under conditions of heat, ascorbic acid consumption is 15-20 mg. higher than for work under normal temperatures. A supplement of 150-200 mg. of ascorbic acid in the daily diet did not significantly improve the work output at high temperature. 90-100 mg. of ascorbic acid daily may be effectively absorbed by men with an average weight of 70 kg. performing intense work in a hot environment.

7550

Grandpierre, R.

[LOCAL REGULATION OF PERIPHERAL CIRCULATION DURING MUSCULAR WORK] Régulation locale de la circulation périphérique au cours du travail musculaire.—*Acta belgica de arte medicinali et pharmaceutica militari* (Bruxelles), 110 (3): 337-344. Oct. 1957. In French, with English summary (p. 343). DNLM

Muscular activity induces important circulatory changes in active muscles; furthermore, there are changes in blood distribution in the adjoining areas rather than in the entire body. The circulatory reaction of active muscle, together with that of the body, produce complex mechanisms in which intervene humoral, endocrine, and nervous activities. The nervous reflex mechanism maintains locally and regionally vasodilatation at the active muscular level and induces vasoconstriction in certain neighboring areas. Thereafter, when necessary, general reflexes are released to maintain circulatory balance. (Author's summary)

7551

Grefe, G. K.

[OPTIMUM FOOD RATIONS FOR CHAMPION-ATHLETES] Optimal'nye normy pitaniia dlia rekordsmenov-gimnastov. — *Voprosy pitaniia* (Moskva), 16 (6): 18-28. Nov.-Dec. 1957. In Russian, with English summary (p. 28).

DLC (QP141.A1V6, v. 16)

The optimum amount of calories per day for sportsmen of an average body weight of 65.6 kg. is 3,823 net or 4,600 total. It is advisable to figure 2.5 g. of proteins per kg. of body weight. Sixty-six percent of the food intake should be of animal origin; 34% of vegetable origin. The ratio of proteins to fats to carbohydrates should be 1:1:3.7, and the total amount of fats per day 169 g. and of carbohydrates, 614 g. The food must be rich in Ca, P, and Fe (Ca:P=1:1.7). Optimum vitamin requirements are as follows: 5,000 I.U. for A; 3.2 mg. for B₂; 15-25 mg. for "P.P." [?]; 125 mg. for C. Daily distribution of calories should be as follows: breakfast 29%; dinner 31%; snack 9%; supper 27%; plus an additional quantity (4%) of bread and sugar. The consumption of raw vegetables and fruits is advised. (Author's abstract, modified)

7552

Green, J.,

B. Balke, and J. Lowe

BIOCHEMICAL CHANGES OF THE BLOOD OF MAN

DURING EXERCISE [Abstract].—*Physiologist*, 1 (1): 35. Nov. 1957. DNLN

Human subjects were exercised on either the treadmill or the electrically controlled bicycle ergometer in two tests of 15 to 24 or 90 minutes. The long-term exercise was maintained at a work load which would give a constant pulse rate of 140-150 beats/minute. The short-term studies varied the intensity of the work each minute until a pulse of 180 was attained. Blood was taken at intervals. In the 90-minute experiment lactic acid rose for about 20 minutes then began to fall toward the resting level. The better the physical condition, the more rapid was this fall. In the graded studies the lactic acid rose in a tri-phasic curve. In all studies, cholesterol rose sharply during the first 12-20 minutes. (From the authors' abstract)

7553

Gursky, K.

[THE EFFECT OF A SUDDEN ASCENT TO A MOUNTAIN PEAK ON THE ORGANISM OF A MOUNTAIN CLIMBER] Vplyv náhleho výstupu na štít na organizmus horolezcu.—*Teorie a praxe tělesné výchovy a sportu* (Praha), 5 (10): 614-620. 1957. In Czech, with English summary (p. 620).

DLC (GV201.T38, v. 5)

Physical examinations were carried out on young mountain climbers before and after a day's high-altitude tour. These included urinalysis, hematology, electrocardiogram, electrophoretic tests, and examination of physical functions. The data show a loss of gamma (3.4) and beta (2.15) globulins and a 6% rise in albumin. The author interprets the changes as indicative of physical stress and the general adaptation syndrome. It is possible to consider them as physiological peculiarities of an organism adapting itself to high altitude.

7554

Hearn, G. R.

SUCCINIC DEHYDROGENASE AND ALDOLASE ACTIVITIES OF SKELETAL MUSCLE OF EXERCISED RATS.—*Jour. Lancet*, 77 (3): 80. March 1957. DLC (R11.J57, v. 77)

Young male rats were exercised 5-8 weeks in a training regimen consisting of swimming for 1/2 hour daily. Pair-fed nonswimming animals served as controls. At the end of the training period, each control animal with its trained partner was sacrificed by decapitation. All exercised animals gained less body weight than did their controls. The adrenals and heart ventricles of the exercised animals hypertrophied significantly, while the skeletal muscles (gastrocnemii) did not. Exercise, whether for 5, 6, 7, or 8 weeks, did not significantly alter the activities of succinic dehydrogenase of skeletal muscle. However, significant increases were seen in aldolase activity.

7555

Hedman, R.

THE AVAILABLE GLYCOGEN IN MAN AND THE CONNECTION BETWEEN RATE OF OXYGEN INTAKE AND CARBOHYDRATE USAGE.—*Acta physiologica scandinavica* (Stockholm), 40 (4): 305-321. 1957. In English. DNLN

Four well-trained male subjects performed ski running at a constant speed on a 750 m. circular track set up on level ground to the point of exhaustion. During 150-160 min. three of the subjects were able to run at a work intensity which corresponded to

an oxygen intake of 3.6-4.1 liters/min.; the fourth at 3.4-3.9 liters/min. during 120 min. The total energy expenditure during this time was 2000-3000 Calories; the pulmonary ventilation rose to a mean of 90 liters/min. and the heart rate was 160-190 beats/min. By determination of the respiratory metabolism the quantity of oxidized carbohydrates was calculated. The RQ values remained during the whole run at a practically constant level. One subject, who had reduced his glycogen depot by 4.45 g., continued to get 55% of his calorie need from carbohydrates, although hypoglycemic symptoms were present. The blood lactic acid concentrations at the end of these long periods of work were slightly increased (20 mg./100 cc.) (Author's summary)

7556

Hollmann, W.,

H. Valentin, and H. Venrath

[ON THE STEADY STATE OF OXYGEN UTILIZATION IN PHYSICAL LOADS ON THE CRANK ERGOMETER] Über das steady state des Sauerstoffverbrauchs bei Belastungen am Drehkurbel-Ergometer.—*Sportmedizin* (Freiburg), 8 (8): 219-221. 1957. In German. DNLN

Spirographic registration of respiration and oxygen uptake were carried out with 128 healthy subjects during 60 minutes of continuous dynamic work of 60-150 watt load on the crank ergometer. A steady state was achieved after 4-5 minutes of work, and an increase of oxygen utilization in transition from air to oxygen breathing from over 40 cc. at rest to 100 cc. during physical work may be interpreted as pathological in terms of a spirographic O₂ deficit.

7557

Klensch, H.,

and H. W. Hohnen

[DETERMINATION OF STROKE AND MINUTE VOLUME BY MEANS OF THE BALLISTIC METHOD AFTER PHYSICAL WORK] Bestimmungen von Schlag- und Minutenvolumen nach Arbeitsleistung mit der ballistischen Methode.—*Pflügers Archiv für die gesamte Physiologie* (Berlin), 265 (3): 207-219. 1957. In German.

Fifty nonathletic and fifty athletic subjects were studied after physical work on a bicycle ergometer (150 w., 5-30 min.) by means of a ballistographic method developed by the authors. The increase in heart minute volume was similar in both groups; however, the heart rate was higher in nonathletes, while the stroke volume was higher in athletes. In both groups the stroke volume increased with intensive work; in athletes it was often three to four times the initial value. Nonathletes were further differentiated by considerably higher time constants for the decline in the heart volume curve after work, and a stroke volume maximum occurring 1 1/2-4 min. after work. Isolated rise in pulse rate during heavy work was not observed.

7558

Kondrashov, S. I.

1957

[THERMOMETRY OF THE HUMAN SKIN DURING PHYSICAL WORK] Termometriia shkiry liudyny pry fizychnii roboti.—*Fiziologichnyi zhurnal* (Kyiv), 3 (2): 76-82. March-April 1957. In Ukrainian, with English summary (p. 82).

DLC (QP1.A453, v. 3)

At the beginning of physical work the skin temperature of the hand decreases, then increases and remains constant for some time, and finally

decreases again. Time and rate of return to normal depend largely on the work load. Repeated loads do not produce the same temperature curves. It appears that the efficiency of the muscles regulates the skin temperature over a given area.

7559

Kozłowski, S.,
and L. Radwan

[THE ANTIDIURETIC ACTIVITY OF THE BLOOD AND PHYSICAL WORK (STATIC AND DYNAMIC)] Aktywność antydiuretyczna krwi a praca fizyczna (statyczna i dynamiczna).—*Acta physiologica polonica* (Warszawa), 8 (4): 677-687. 1957. In Polish, with English summary (p. 686-687). DNLN

Antidiuretic activity of the blood was found considerably increased after dynamic work (riding a cyclometer) and static work (holding legs in a horizontal position until fatigue set in). Dynamic work was associated with a large increase of the osmotic pressure of blood. In static work the changes of the osmotic pressure were small. It is concluded that a decrease of diuresis in physical work is not only the result of a decreased glomerular filtration connected with hemodynamic changes, but is caused also by the increase in the antidiuretic activity of blood and more intense reabsorption of water.

7560

Kraut, H.,

H. Zimmermann, M. Böhm, and W. Keller [RESEARCH ON THE CARBOHYDRATE AND LIPID METABOLISM AT PHYSICAL WORK. I. THE BEHAVIOR OF THE RESPIRATORY QUOTIENT DURING WORK WITHOUT PRIOR FOOD INGESTION] Untersuchungen über den Kohlenhydrat- und Fettstoffwechsel bei körperlicher Arbeit. I. Das Verhalten des respiratorischen Quotienten bei Arbeit ohne vorhergehende Nahrungsaufnahme.—*Internationale Zeitschrift für angewandte Physiologie* (Berlin), 16 (5): 409-420. 1957. In German. DNLN

The respiratory quotient (R.Q.) at rest and also at work was found to correspond to the values calculated from the carbohydrate-fat ratio. The variability decreases markedly during work. Thirty minutes after work the R.Q. was still below the initial values, pulse rate had not yet returned to resting rate and the oxygen deficit was not yet compensated. However, even when fully compensated an hour after work, the R.Q. was still below the resting values prior to experiment, which is interpreted as due to lowered carbohydrate stores. At work of light and medium intensity the R.Q. does not reflect the work intensity. R.Q. during work is higher in nonathletic subjects than in athletes.

7561

Kraut, H.,

H. Zimmermann, M. Böhm, and W. Keller [RESEARCH ON CARBOHYDRATE AND FAT METABOLISM DURING PHYSICAL WORK. II. CHEMICAL CHANGES IN BLOOD DURING WORK WITHOUT PRIOR FOOD INTAKE]. Untersuchungen über den Kohlenhydrat- und Fettstoffwechsel bei körperlicher Arbeit. II. Chemische Veränderungen im Blut bei Arbeit ohne vorhergehende Nahrungsaufnahme.—*Internationale Zeitschrift für angewandte Physiologie* (Berlin), 16 (5): 421-433. 1957. In German. DNLN

During work the blood sugar and pyruvic acid levels fell steadily while the total fatty acids increased slightly. The blood ketone bodies rose consistently at work loads of 9.5 mkg/sec. for four hours. Composition of the food ingested prior to work exerted no

effect on blood sugar. At 50% fat intake the level of pyruvic acid and fatty acids were the lowest. The rise in ketone bodies was related to the amount of fat ingested. Shift in the performance level did not affect the rise in ketone bodies as long as the total amount of work remained the same. An hour after work the ketone bodies were still rising.

7562

Lanne, R. de

[REPERCUSSION OF MUSCULAR ACTIVITY ON RENAL FUNCTION] Répercussion des activités musculaires sur le fonctionnement rénal.—*Acta belgica de arte medicinali et pharmaceutica militari* (Bruxelles), 363-372. Oct. 1957. In French, with English summary (p. 371). DNLN

Physical activity produces changes in kidney blood composition, distribution, and pressure. A decrease and inhibition of diuresis is noted, along with a decrease in renal clearance. The decrease in glomerular function during muscular activity is responsible for the appearance of urinary albumin. Albuminuria is benign and disappears rapidly. It is influenced by the duration and intensity of exercise. Cylindruria also appears frequently and is benign. It is caused by coagulation of erythrocytes which have escaped into the glomerular endothelium.

7563

Leusen, L.,

G. Demeester, and J. J. Bouckaert [ARTERIAL CHEMO- AND PRESSORECEPTORS AND RESPIRATION DURING MUSCULAR EXERCISE] Chémo- et presso-récepteurs artériels et respiration au cours de l'exercice musculaire.—*Acta physiologica et pharmacologica neerlandica* (Amsterdam), 6: 43-52. 1957. In French, with English summary (p. 51). DLC (QP501.A3, v. 6)

Carbon dioxide and oxygen concentrations and pH of arterial blood were measured at rest and during exercise on a treadmill, in normal dogs and in animals in which carotid bifurcations had been acutely denervated and the vagus nerves cut under local anesthesia. No significant changes were observed during exercise in the hydrogen, carbon dioxide, and oxygen concentrations of the arterial blood in denervated dogs. The variations which occurred were very similar to changes observed in normal control animals. This indicates that adaptation of the ventilation to the increased metabolism during exercise is maintained in the absence of arterial chemo- and pressoreceptors. However, at rest the pH of arterial blood was regularly lower in denervated animals than in the controls. (Authors' summary, modified)

7564

Lukin, L.,

and H. J. Ralston [OXYGEN DEFICIT AND REPAYMENT IN EXERCISE].—*Internationale Zeitschrift für angewandte Physiologie* (Berlin), 19 (3): 183-193. 1962. In English. DNLN

Oxygen deficits and repayments were measured during mild, moderate, and intense exercise in young male adults. The individual values of the ratio of repayment to deficit (R/D) varied widely, ranging from 0.6 to 3.6. It was not possible to predict the value for this ratio in any single experiment. It is concluded that such measurements cannot be used to estimate the efficiency of the chemical recovery process. The sources of error in such studies are

discussed and reasons suggested for the observed variability in the R/D ratio. (Authors' summary)

7565

Maggio, M.,
and W. Keller

[RESPIRATORY QUOTIENT AND PULSE RATE DURING PROLONGED MUSCULAR WORK] Rendimento respiratorio e frequenza del polso durante lavoro muscolare protratto.—Lavoro umano (Firenze), 9 (12): 593-602. Dec. 1957. In Italian, with English summary (p. 601). DNLM

During prolonged work on a bicycle ergometer the respiratory quotient and pulse rate were determined and the values compared. A load of 18 mkg./second led to exhaustion within 30 minutes and was beyond the endurance limit. At a load of 9.5 mkg./second, respiratory efficiency remained unchanged during the four hours of the entire experiment. The constant rise of pulse rate indicated mounting fatigue and a "false steady state". The results are discussed as to application of this method to the determination of work capacity for an 8 hour period. (Authors' summary, modified)

7566

Malarecki, I.

[FROM THE INVESTIGATIONS ON THE CONTROL OF RESPIRATION DURING WORK] Z badań nad świadomą kontrolą oddychania podczas pracy. — Acta physiologica polonica (Warszawa), 8 (3-3a): 436-437. 1957. In Polish. DLC (QP1.A27, v. 8)

Voluntary control of respiration may be of value during certain periods of physical work. It was shown that such control was most beneficial in the early stages of adaptation to work. During this period, it was possible to perform under oxygen debt conditions. Because of increased respiratory activity there was a slight temporary rise in the respiratory quotient and in CO₂ elimination. This, in turn, decreased the oxygen requirement and pulmonary ventilation. Voluntary respiration, however, requires more oxygen for the respiratory musculature and therefore appears to be less economic than normal (automatic) respiratory activity. Furthermore, the respiratory pause is longer during normal than during controlled respiration.

7567

Marshall, M. E.,
and T. A. Maeva

HYPOXIC PHENOMENA IN MUSCLE ACTIVITY.—Bull. Exper. Biol. and Med. (Consultants Bureau, New York), 41 (6): 471-473. 1957.

DLC (R860.B8, v. 41)

English translation of item no. 6107, vol. V.

7568

Mellerowicz, H.

[ON THE PROBLEM OF HYPOXIC HAZARDS TO THE ATHLETE'S HEART] Zur Frage der Hypoxie-Gefährdung des Sportlers.—Medizinische Klinik (München), 52 (28): 1221-1223. July 12, 1957. In German.

After extensive investigations of cardiac hypertrophy in athletes, it was concluded that it is in no way analogous to the hypertrophy of the cardiac patient's heart caused by insufficient oxygen supply. Rather, the athletic enlargement constitutes an adaptive reaction which permits the heart to increase its work output with a minimum of effort. Training re-

sults in considerable improvement of the coronary circulatory function and consequently the oxygen supply to the heart. There is no proof of a significant danger of hypoxia incurred in athletic endeavor. Histological findings of hypoxemic necroses of the heart in athletes have not shown as yet athletic training to be the responsible factor.

7569

Mitolo, M.

[ELECTROMYOGRAPHIC STUDY DURING PROGRESSIVE TRAINING IN PHYSICAL EXERCISE] Studio elettromiografico nel corso dell'allenamento all'esercizio fisico.—Lavoro umano (Firenze), 9 (1): 1-21. Jan. 1957. In Italian, with English summary (p. 19-20). DNLM

With progressive training in rowing exercises, the electromyogram of a motor unit of the right brachial biceps showed a gradual increase of the average duration of the intervals of electric discharge (with progressive decrease of the average frequency of the potentials) and a gradual regularization of the duration of these intervals. (Author's summary) (36 references)

7570

Nowakowska, A.

[STUDIES ON THE EFFECT OF STATIC EFFORT ON THE CONDITIONED REFLEX FUNCTION IN MAN] Badania nad wpływem wysiłku statycznego na czynność odruchowo-warunkowa człowieka. — Acta physiologica polonica (Warszawa), 8 (4): 669-676. 1957. In Polish, with English summary (p. 676). DLC (QP1.A27, v. 8)

Static effort of healthy young men first intensified the positive conditioned responses while inhibitory reactions to differential stimuli were retained. Later the positive response was weakened and the reflex became inconsistent. In the final phase, characterized by deep fatigue, both the positive and the differential stimuli gave negative inhibitory responses. During rest the conditioned reflex function regained its regularity.

7571

Perret, C.

[EFFECT OF REPEATED HYPEROXIA ON VENTILATION DURING MUSCULAR EXERCISE (PRELIMINARY RESULTS)] Effet des hyperoxies iteratives sur la ventilation lors de l'exercice musculaire (résultats préliminaires).—Revue médicale de Nancy, 82 (78): 936-939. Aug.-Sept. 1957. In French. DNLM

During muscular exercise using the Fleisch ergostat for one hour, 15 subjects breathed atmospheric air during the first 20 minutes of the experiment, air containing 40% oxygen for 20-40 minutes, and air containing 80% oxygen for 40-60 minutes. Hypoventilation occurred following the first hyperoxia and was due to suppression of a hypoxemic stimulus. It is presumed that this stimulus persists during muscular exercise and its suppression causes hypoventilation. This suppression is accentuated during the second hyperoxia (80% oxygen) and produces a new hypoventilation.

7572

Pitteloud, J. J.

[EFFECTS OF AGE AND TRAINING ON RESPIRATORY EXCHANGE MEASURED IN A BALANCED STATE DURING MUSCULAR EXERCISE] Effets de l'âge et de l'entraînement sur les échanges respira-

toires mesurées en état d'équilibre lors de l'exercice musculaire.—Revue médicale de Nancy, 82 (78): 880-884. Aug.-Sept. 1957. In French. DNLM

A comparative respiratory study was made between subjects 18-32 years of age (untrained civil servants) and subjects 40-60 years of age (well-trained gendarmes and untrained civil servants) performing muscular exercise for 20 minutes. The results showed that: (1) ventilation during physical effort was higher in aged persons than in younger ones; (2) trained subjects conserved their strength and displayed intermediary respiratory values between young subjects and untrained older subjects; and (3) ventilatory values did not differ between subgroups of 40-50 years and 50-60 years of age.

7573

Robinson, S.,

D. L. Robinson, and R. J. Mountjoy
CHANGES IN O₂ REQUIREMENTS OF MEN DURING EXHAUSTING RUNS [Abstract].—Federation Proceedings, 16 (1, part 1): 108. March 1957.

DLC (QH301.F37, v. 16)

In four experiments a man ran on the treadmill at 13.3 m.p.h. for the exact times of 1, 2, 2.4, and 3 minutes, respectively. Both the runner's oxygen requirement and rate of lactic acid accumulation were found to decrease in the second minute of a 2-minute run at constant speed and then to increase markedly in the last half minute as he approached exhaustion. (Authors' abstract, modified)

7574

Romanowski, W.,

and J. Siedelnik

[THE EFFECTS OF PHYSICAL EFFORT ON THE ELECTROPHORETIC PICTURE OF BLOOD SERUM PROTEINS] Wpływ wysiłku fizycznego na obraz elektroforetyczny białek surowicy krwi.—Acta physiologica polonica (Warszawa), 8 (3-3a): 513-515. 1957. In Polish. DLC (QP1.A27, v. 8)

Experiments on normal subjects showed that physical effort producing fatigue caused, in some cases, tachycardia and increase of systolic blood pressure and of hematocrit values. The blood albumens did not change significantly, but changes were observed in globulin content (alpha₂ globulin decreased, gamma globulin increased, while alpha and beta globulins did not significantly change). Blood pressure increase and tachycardia were directly proportional to the increase in gamma globulin.

7575

Roorbach, E. H.,

T. P. K. Lim, and U. C. Luft

CARDIAC AND METABOLIC RESPONSE OF NON-ATHLETES TO GRADED EXERCISE [Abstract].—Physiologist, 1 (1): 72-73. Nov. 1957. DNLM

Eighty-four healthy males between 22 and 45 years of age performed graded exercise on a bicycle ergometer. The initial work load of 300 mkg./minute was maintained for 3 minutes and then raised by 75 mkg./minute each following minute. The test was terminated at the end of the minute in which a pulse rate of 180 was attained or exceeded. Since metabolic rate at work varied in proportion to body mass in persons of normal physique, oxygen intake was calculated per kilogram body weight and plotted against the corresponding heart rate. Statistical treatment of the pooled data revealed good correlation, the linearity of which was highly significant.

The regression line of oxygen intake/kilogram of body weight/minute (y) on heart rate (x) followed the equation $y = 209x - 10$. Individual performances were rated on the basis of the level and slope of their oxygen intake versus pulse curve in relation to the regression line. (From the authors' abstract)

7576

Sartorelli, E.,

and C. Sbertoli

[MEASUREMENT OF MUSCULAR FATIGUE BY THE STUDY OF CARDIAC FREQUENCY DURING WORK]

Misura della fatica muscolare mediante lo studio della frequenza cardiaca durante il lavoro.—Medicina del lavoro (Milano), 48 (3): 159-164. March 1957. In Italian, with English summary (p. 163).

DNLM

By means of an electronic pulse counter, continuous measurements were made of cardiac frequency in normal young subjects during work of various types and intensity lasting for four hours. The results showed that cardiac frequency remained constant during light, medium, and even hard work provided that it was performed under favorable environmental conditions, indicating that a state of fatigue was never observed. Cardiac frequency progressively increased during hard work performed under unfavorable conditions indicating that work caused fatigue.

7577

Segers, M.,

and P. de Lillie

[ELECTROCARDIOGRAPHIC CHANGES AFTER EFFORT IN YOUNG AND HEALTHY SUBJECTS]

Modifications électrocardiographiques après effort chez des sujets jeunes et bien portants.—Acta belgica de arte medicinali et pharmaceutica militari (Bruxelles), 110 (3): 383-391. Oct. 1957. In French, with English summary (p. 390). DNLM

Electrocardiograms registered before and after a cross-country run of 1 to 7 km. in several hundred young athletes and young military men revealed the following: (1) in a minority of subjects there was a slight decrease of the ST segment, and (2) in 30% of the subjects there was a rotation of the electrical axis towards the right in standard leads, a decrease of R amplitude and a change of T wave shape and amplitude. These changes sometimes persisted for 1-2 hours after the end of exertion and are important in evaluating cardiac pathology.

7578

Slapak, L.

[OBSERVATIONS ON THE ATROPINE EXPERIMENT WITH THE PROLONGED PQ-INTERVAL OF THE ELECTROCARDIOGRAM IN ATHLETES AT REST]

Beobachtungen über den Atropinversuch bei im Ruhezustand verlängertem PQ-Zeit von Sportlern.—Acta neurovegetativa (Wien), 15 (3): 269-272. 1957. In German. DNLM

An atropine experiment was conducted with 10 well-trained athletes, whose electrocardiogram at rest showed a lengthening of the PQ-interval well over 0.20 sec., which returned to normal after work. Fourteen to forty-five min. after atropine injection the PQ-interval returned to normal in all subjects. The positive reaction is regarded an additional indication that the prolonged PQ-interval in ECG at rest is due to the increased vagal tone in the well-trained athlete. (Author's summary)

7579

Styns, H. J.,

and M. Ostyn

[NOTE ON THE CHANGE OF BLOOD pH OBSERVED AFTER PHYSICAL EFFORT IN MAN] Note sur la modification du pH sanguin observée après effort physique chez l'homme.—Comptes rendus de la Société de biologie (Paris), 151 (2): 115-116. Sept. 5, 1957. In French. DLC (QP1.S7, v. 151)

Fifty-six males 18-23 years of age showed a decrease in the values of venous blood pH after performing the step-test. The difference between the values obtained before and after the test showed a certain statistical significance ($p < 0.001$).

7580

Trakhtenberg, I. M.,

and I. V. Savitskii

[EXPERIMENTAL DATA ON SECHENOV'S PHENOMENON DURING DYNAMIC WORK. II. CHANGES IN EFFICIENCY IN THE PROCESS OF PROLONGED MUSCULAR ACTIVITY WITH PASSIVE AND ACTIVE INTERRUPTIONS] Eksperimental'nye dannye o fenomene Sechenova pri dinamicheskoi rabote. II. Izmenenie rabotosposobnosti v protsesse dlitel'noi myshechnoi deiatel'nosti s passivnymi i aktivnymi pereryvami.—Biulleten' eksperimental'noi biologii i meditsiny (Moskva), 43 (1): 28-31. Jan. 1957. In Russian, with English summary (p. 31). DLC (R850.B55, v. 43)

Work was done by 7 subjects using the right hand on a digital ergograph until complete exhaustion was reached. Between work periods were periods of passive (total) rest or periods of active rest during which work was done with the left hand. Intensification, relaxation, and disappearance of working efficiency after active rest depended upon the degree of fatigue developed by muscular action. A gradual intensification of the Sechenov effect in the first period of dynamic work may be accounted for by the intensification of inhibition in nervous centers due to the increase in fatigue with further work. With stronger fatigue the intensified inhibition acquires a more pronounced character at the expense of simultaneous negative induction appearing during the active rest.

7581

Venrath, H.,

W. Bolt, W. Hollmann, H. Valentin, and H. Kesteloot

[INVESTIGATIONS ON THE PROBLEM OF BLOOD DEPOTS IN MAN] Untersuchungen zur Frage der Blutdepots beim Menschen.—Zeitschrift für Kreislaufforschung (Darmstadt), 46 (15/16): 612-615. Aug. 1957. In German. DNLM

Investigations of blood volume by means of radioactive phosphorus (P^{32}) and iodine (I^{131}) were carried out before and after physical work. The physical stresses employed were the climbing of stairs, knee bends, and work at the turnstile ergometer. The subjects were athletes, nonathletic healthy individuals, and convalescents. There were no findings that would show blood depots either for erythrocyte storage or for plasma, which would be mobilized by work and made available to the circulatory system.

7582

Vereshchagin, N. K.

1957

[THE EFFECT OF STATIC EXERTION ON BODILY FUNCTIONS] O deistvii staticheskikh usilii na

funktsii organizma.—Fiziologicheskii zhurnal SSSR (Moskva), 43 (7): 699-704. July 1957. In Russian, with English summary (p. 704).

DLC (QP1.F57, v. 43)

A series of investigations by the author and his collaborators provide data on a number of changes accompanying static effort: inhibition of conditioned alimentary motor and secretory reflexes and of vascular reflexes; increased leukocyte count and phagocytic index; decreased prothrombine time etc. According to these data the mechanism whereby static efforts affect bodily functions appears in a new light. It is suggested, that Lindhard's phenomenon and similar effects are due to positive induction raising the excitability of the nervous centers which have been inhibited at the time of actual performance of static effort. (Author's summary)

7583

Vinařický, R.,

M. Kuncová, and E. Zbránková

[THE IMPORTANCE OF THE ACID-BASE BALANCE IN PHYSICAL TRAINING] Význam acidobazické rovnováhy při tělesných cvičeních.—Teorie a praxe tělesné výchovy a sportu (Praha), 5 (3): 167-174. In Czech, with English summary (p. 174).

DLC (GV201.T38, v. 5)

Decrease of the alkaline reserve was studied after a standard performance of running, including its restitution during the process of recovery and rest with individuals of varying efficiency. This phenomenon was analyzed in connection with short-term training of small intensity. The stability of the acid-base balance is improved after training in individuals with little physical training or those who had interrupted training. Short-term exercise has no beneficial effect on the maintenance of the acid-base balance in trained athletes. (Authors' summary, modified)

7584

Wachholder, K.

[ON THE DEVELOPMENT OF CHANGES IN THE WHITE BLOOD CELL COUNT DURING AND AFTER PHYSICAL WORK] Zur Entstehung der Veränderungen des weissen Blutbildes bei und nach Muskelarbeit.—Internationale Zeitschrift für angewandte Physiologie (Berlin), 16 (5): 356-360. 1957. In German. DNLM

The decrease in polymorphonuclear cells and lymphocytes which follows strenuous work is also evoked by injections of adrenocorticotrophic hormone (ACTH). These findings suggest that the leukocyte reaction is due to a release of ACTH during physical stress. Variations in blood composition during work could be partly reproduced by adrenalin injection, but not by ACTH. The extent of the delayed neutrophil reaction after work does not permit an estimate of the amount of ACTH or adrenocortical hormones released. Several reasons are advanced why an extensive late leukocytosis may not always be a symptom of excessive stress with toxic sequelae. (Author's summary, modified)

7585

Welch, B. E.,

E. R. Buskirk, and P. F. Iampietro

CALORIC INTAKE AND ENERGY EXPENDITURE OF EIGHT MEN IN A TEMPERATE ENVIRONMENT.—Medical Nutrition Lab. (U. S. Army), Denver, Colo. Report no. 196, Jan. 21, 1957. [13] p. AD 122 223

UNCLASSIFIED

6. EFFECTS OF ENVIRONMENTAL FACTORS AND STRESSES

Caloric intake and expenditure were studied in eight men during a twelve-day period in a temperate environment at Natick, Massachusetts. Outdoor activity consisted of marching 10 to 11 miles per day. The mean ambient temperature during daylight hours was 22.2° C. (72° F.), the mean relative humidity was 68%, and the mean windspeed was 2.8 miles per hour. Caloric intake averaged 2812 Calories/man/day during the entire study. The range in the average caloric intake was from 2259 to 3454 Calories/day. Average body weight changed little during the course of the study. Daily energy expenditure (marching and other activities) during the entire study was 2899 Calories/man/day, and ranged from 2625 to 3163 Calories/day. (Authors' summary)

7586

Wolf, J.

[ELECTROCARDIOGRAPHIC DATA DURING THE PEACE BICYCLE RACE IN 1956] Elektrokardiografická pozorování při Závodě míru 1956.—Teorie a praxe tělesné výchovy a sportu (Praha), 5 (4): 225-234. 1957. In Czech, with English summary (p. 234). DLC (GV201.T38, v. 5)

Electrocardiographic examinations using standard and unipolar chest and limb leads were performed on cyclists during several competition bicycle races. Changes in the duration of the electric systole were the best indicators of the state of the cardiovascular system. Changes in duration of atrioventricular conduction, rhythm, and frequency, and signs of incomplete right bundle branch block were less characteristic. Signs of hypertrophy of the left and right ventricles were found in a 2:1 ratio. A more marked hypertrophy of the left ventricle appeared after a longer racing period. Most competitors had a relatively short electric systole when at rest; this systole became successively longer during the race. In the first stage of the race atrioventricular conduction became shorter. Increase of the atrioventricular conduction at the end of the race may be a sign of fatigue. In 43.8% cyclists an incomplete right bundle branch block was registered. Some showed and aggravation of the right ventricle conduction while in others it shifted towards normal. Other changes, e.g., a wandering pace-maker and ST alterations, are subject of further study. (From the author's summary)

7587

Wolffe, J. B.

THE HEART OF THE ATHLETE.—*Jour. Lancet*, 77 (3): 76-78, March 1957. DLC (R11.J57, v. 77)

Wide variations in heart size, pulse rate, blood pressure, and electrocardiogram were found in athletes in comparison to the results obtained from average persons of the same height and weight. From the clinical viewpoint, the term "athletic heart" (hypertrophy) is considered inaccurate.

i. Fatigue

7588

Aiken, E. G.

RESPONSE REVERSAL AND FATIGUE.—*Army Medical Research Lab., Fort Knox, Ky. (Project no. 6-95-20-001, Subtask USAMRL S-4 MEDEA). Report no. 289, June 28, 1957. ii+13 p. AD 135 301*

PB 136 558

The acquisition of a simple psychomotor skill was significantly retarded under a fatigue-inducing performance procedure. A subsequent incompatible skill was similarly affected by fatigue. The number of inordinantly long response times (here termed psychological blocks) was shown to relate clearly to the fatigue variable. Psychological blocking was shown to be relatively independent of speed and error measures of fatigue, and there were indications that blocking serves a rewarding function in the course of the operation of fatigue processes. (From the author's abstract)

7589

Aubert, X.

[MUSCULAR INTERVENTION IN THE PHENOMENA OF FATIGUE] L'intervention musculaire dans les phénomènes de fatigue.—*Acta belgica de arte medicinali et pharmaceutica militari (Bruxelles)*, 110 (3): 325-333. Oct. 1957. In French, with English summary (p. 332). DNLM

Muscular fatigue does not result from glycogen decrease, nor from an excess accumulation of lactic acid. It is caused primarily by the disappearance of adenosine triphosphate and other high-energy phosphorus compounds. Mention is made of the role of Kuhne spindles which contain the proprioceptive receptors of muscular elongation, as well as the mechanism of spinal reflexes, in the automatic adjustment of the muscular response. (Author's summary)

7590

Derevianko, E. A.

1957

[ON THE DYNAMICS OF FATIGUE DEVELOPMENT IN FLIERS DURING THE FLIGHT] O dinamike razvitiia utomleniia letnogo sostava v polete [Abstract]. — *Voenno-meditsinski zhurnal (Moskva)*, 1957 (11): 78-79. Nov. 1957. In Russian.

DLC (RC970.V55, v. 1957)

The dynamics of fatigue development was studied on 9 pilots. Each performed 4-6 daily flights of identical nature. The efficiency of flight performance (piloting, landing, etc.) was recorded by an automatic movie camera. Before the first flight and after the last daily flight, conditioned and unconditioned motor responses were tested and simple arithmetic problems were solved. None of the pilots tested complained of fatigue up to the third flight. On the contrary, after the second and third flights the pilots solved the problems more accurately and faster. Most pilots performed their fourth flights slightly worse than the third, but better than the first or second (compensated form of fatigue). When the fliers complained of being tired, without loss of efficiency, a decrease of inhibitory and an increase of stimulatory processes were noted. The data obtained can serve as the basis for the determination of norms of the pilot's daily load.

7591

Frada, G.,

and L. Salamone

[ON THE HEMATOLOGICAL MODIFICATIONS OF FATIGUE: EFFECT OF CHLORPROMAZINE] Sulle modificazioni ematologiche da affaticamento: influenza della clorpromazina.—*Medicina del lavoro (Milano)*, 48 (8-9): 458-467. Aug.-Sept. 1957. In Italian, with English summary (p. 466). DNLM

Effort of varying intensity in 15 normal subjects was found to cause typical blood changes (erythro-

cytosis, not always with reticulocytosis, increased erythrocyte volume, slight decrease in minimal erythrocyte resistance, leukocytosis with neutrophilia and eosinopenia, and increase in blood platelet number). Coagulation changes seen were increased blood and plasma coagulability, prothrombin activity, accelerin, thromboplastin, and less frequently of Factor VII. These changes were mostly correlated with the intensity of effort. Administration of chlorpromazine to these subjects inhibited frequently the greater portion of blood picture changes, while it scarcely affected the coagulation changes. This inhibitory effect can be interpreted through the various neuro-hormonal activities of chlorpromazine acting on the ascending reticular system. It can also provide valuable indications as to the significance of hematological changes due to fatigue. (Authors' summary, modified)

7592

Fraser, D. C.

A STUDY OF FATIGUE IN AIRCREW. IV. OVERVIEW OF THE PROBLEM.—RAF Inst. of Aviation Medicine (Gt. Brit.), Farnborough; issued by Flying Personnel Research Committee (Gt. Brit.). Report no. FPRC 984, Feb. 1957. 5 p. AD 130 087

UNCLASSIFIED

Findings from research on certain fatigue-induced factors examined indicated that: (1) a significant fatigue effect occurs in subjects tested after flying continuously for more than 10 hours in a piston-engine aircraft, and after three 1-hour sorties in a jet fighter aircraft during the day or after two 1-hour sorties at night; (2) no significant fatigue effect was observable in subjects tested after continuous sorties for 3 to 4 hours in a jet bomber during the day; (3) the fatigue effect in night flying was greater than in day flying of equivalent length; (4) considerable fatigue may be produced by flying four 15-hour sorties at night with one day's rest between each sortie in long-range piston-engined aircraft; (5) subjective reports of fatigue in the individual scores of subjects were significantly correlated with objective deterioration of vigilance; (6) a tendency for a progressive deterioration of vigilance appeared to occur from the first to the fourth sortie; (7) the significance of a deterioration in vigilance depended on the task performed; (8) marked changes in performance and subjective states of subjects after prolonged, repeated flights occurred without extensive and as yet detectable physiological changes; and (9) individual differences in maintaining a good vigilance score on the task were evident. (AD abstract, modified)

7593

Gieseeking, C. F.,

H. L. Williams, and A. Lubin

THE EFFECTS OF SLEEP DEPRIVATION UPON INFORMATION LEARNING [Abstract].—Amer. Psychologist, 12 (7): 406. July 1957.

DLC (BF1.A55, v. 12)

Immediate recall of general information items presented daily was found to be significantly impaired during sleep deprivation for 96 hours. The amount of impairment was a decreasing monotonic function of the amount of sleep loss. Delayed recall dropped significantly after 48 hours, but showed no further decrease up to 96 hours of deprivation.

7594

Haider, M.

[EXPERIMENTAL CONTRIBUTION ON THE BE-

HAVIOR OF THE NEGATIVE AFTER-IMAGE IN FATIGUE] Experimenteller Beitrag zum Verhalten des negativen Nachbildes bei Ermüdung.—Zeitschrift für experimentelle und angewandte Psychologie (Göttingen), 4 (1): 94-103. [1957]. In German, with English summary (p. 102). DNLN

As a new method of assessing fatigue, the negative after-image was measured before and after fatiguing, keeping stimulus and external conditions constant. The duration of the red-green after-image was found to be increased by 25% after eight hours of heavy physical and mental work. After one and a half hours of continuous dancing the increase was 29%. A decrease of 7%, however, took place when listening quietly to music. A decrease of 9% occurred under similar conditions after the administration of Kraepelin's work test (adding of tables of numbers). However, a comparison between work curves and after-image changes revealed an increased duration of the after-image in subjects reporting fatigue. Results were essentially the same for red-green and black-white after-images. (Author's summary)

7595

Hauty, G. T.,

and R. B. Payne

BEHAVIORAL AND PHYSIOLOGICAL CONSEQUENCES OF THIRTY HOURS OF SUSTAINED WORK [Abstract].—Amer. Psychologist, 12 (7): 405. July 1957. DLC (BF1.A55, v. 12)

Subjects required to perform a complex perceptual-motor task for 30 consecutive hours without sleep showed a regular pattern of proficiency decline, and experienced brief and irregular instances of visual and proprioceptive delusions and hallucinations. Urinalyses revealed little or no temporal change in physiological function.

7596

Hohwü, E.

[FLIGHT CREW FATIGUE] Flygtrötthet.—Meddelanden från flyg- och navalmedicinska nämnden (Stockholm), 6 (3): 1-9. 1957. In Swedish, with English summary (p. 9.) DNLN (W1SW387, 1957)

An attempt was made to analyze the so-called flight crew fatigue, particularly in transcontinental flights. The fatigue is caused in this case mainly by environmental factors. On flight routes going east-west or west-east the great problem is the change in sleep rhythms which creates difficulties when the crew members shall have their scheduled sleep and even more when they have to stay awake during flight at night for several hours when nothing happens. It might be advisable to increase the present work load for certain crew members during such periods of inactivity at night simply to improve their state of alertness. Fatigue and sleepiness should not be confused in a discussion on flight crew fatigue. (Author's summary)

7597

Jones, M.

THE EFFECT OF FATIGUE IN FLIGHT ON GASTRIC SECRETORY AND MOTOR ACTIVITY AND THE RENAL EXCRETION OF UROPEPSIN.—In: The first European congress of aviation medicine, p. 181-191. Aeromedica acta (Soesterberg, Netherlands), Special edition, 1957. In English. DNLN

The secretory and motor gastric activity and the rate of renal excretion of uropepsin were increased during 24-hour periods which included a 15-hour night

sortie conducted as a part of a series of fatigue trials. There was a tendency for the gastric motility to increase progressively from the beginning to the end. The experimenter served as a pilot and as the subject for this experiment. The findings are viewed as reflecting measurable changes in the organism due to fatigue.

7598

Krkovic, A.

[CAN THE ACUITY OF STEREOSCOPIC VISION SERVE AS A TEST OF FATIGUE?] Može li ostrina stereoskopskog vida poslužiti kao test umora.—*Arhiv za higijenu rada i toksikologiju* (Zagreb), 8 (3): 215-221. 1957. In Croatian, with English summary (p. 221). DNLM

Stereoscopic acuity was measured by a modified lenticular stereoscope to an accuracy of 0.001 mm. The method of constant stimuli was used. The interval of uncertainty about the point of subjective equality was taken as an index of stereoscopic acuity. The measurements were taken before and after these conditions: (1) step test as a physical stress, (2) prolonged mental work, and (3) after 30 hours of sleep deprivation. In spite of some minor decrements in stereoscopic acuity after all three conditions, the acuity of stereoscopic vision could not be regarded as a sufficiently sensitive indicator of underlying physiological changes. (Author's summary, modified)

7599

Lomonaco, T.

[FATIGUE OF PILOTING] La fatica del pilotaggio.—*Rivista aeronautica* (Roma), 33 (5): 553-576. May 1957. In Italian. DLC (TL504.R54, v. 33)

Factors responsible for fatigue in piloting are intense and long flights, bad weather, instrument flight, cold, disorientation, delay prior to landing, low-altitude flight, fast pre-flight briefing, noise, vibrations, prolonged anoxia or decompression, rapid changes in altitude, and emotions. Causes provoking or aggravating flight fatigue include insufficient nutrition, sleep, rest, and recreation; preoccupation with problems of family, career, etc., and abuse of alcohol and tobacco. Consideration is given to the localization (nerves, muscles) of fatigue, and its forms (acute, chronic) and symptomatology. The principle means of preventing fatigue are enforcement of obligatory rest periods, eating of a balanced diet, practice of physical exercise, adequate nightly rest, and restriction in the use of alcohol and tobacco. (36 references).

7600

Mitnick, L. L.,

and J. C. Armington

ALPHA RHYTHM DURING SLEEP DEPRIVATION AND RECOVERY [Abstract].—*Amer. Psychologist*, 12 (7): 405-406. July 1957. DLC (BF1.A55, v. 12)

A decrement in alpha rhythm was observed during performance of simple tasks and mental addition in 10 subjects deprived of sleep for 98 hours. The decrement was greatest for simple tasks, while prior to and following deprivation simple tasks were associated with the highest alpha. Recovery after deprivation was gradual for both tasks, and was generally complete after 48 hours.

7601

Paluch-Wolska, J.

1957

[STUDIES ON THE EFFECT OF FATIGUE UPON THE CONDITIONED REFLEXES IN RATS] *Badania*

nad wpływem zmęczenia na reakcje odruchowo-warunkowe u szczurów. — *Acta physiologica polonica* (Warszawa), 8 (4): 689-698. 1957. In Polish, with English summary (p. 697-698)

DLC (QP1.A27, v. 8)

Heavy physical exertion of rats swimming 20-60 minutes produced a decrease and delay of the reactions to conditioned stimuli. Lighter exertion induced either a higher sensitivity to conditioned stimuli or an inhibition of these stimuli. All these changes depend on the condition of the autonomic and central nervous systems.

7602

Pearson, R. G.

TASK PROFICIENCY AND FEELINGS OF FATIGUE.—School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 57-77, April 1957. 5 p. AD 140 469 UNCLASSIFIED

One hundred subjects received 50 minutes of training on a complex, fatiguing, perceptual motor task. Following a 10-minute rest period, the subjects continued at the task for a period of 3 hours during which measures of task proficiency were continuously recorded. A 13-item checklist, previously developed and validated to measure feelings of fatigue, was administered before the learning period, during the rest period, and upon completion of the task. Correlations between task proficiency criteria and checklist data (subjective fatigue) were not significantly different from zero. It was concluded that the way a subject says he feels prior to a 3-hour psychomotor task and the way he performs the task are not necessarily related, nor do the subject's feelings necessarily parallel his performance. (Author's abstract)

7603

Schein, E. H.

THE EFFECTS OF SLEEP DEPRIVATION ON PERFORMANCE IN A SIMULATED COMMUNICATION TASK.—*Jour. Applied Psychol.*, 41 (4): 247-252. Aug. 1957. DLC (BF1.J55, v. 41)

The effect of sleeplessness on performance in a communication task was studied by measurement of the number and type of errors committed in giving and receiving instructions to construct patterns from 10 or 25 domino-shaped pieces. Increasing decrements in performance were observed after 55 and 70 hours of sleeplessness, reaching 11% in receiving and 6-7% (insignificant) in sending after 70 hours. The time required to send instructions and the number of spontaneously-corrected errors in sending were increased during sleeplessness. Horizontal-vertical receiving mistakes were less frequent than top-bottom or right-left errors under control conditions, and were increased less during sleeplessness. Marked individual differences in both sending and receiving were observed, and the decrement in sending performance during sleeplessness was greater in more intelligent subjects. It is concluded that the decrement in performance observed during sleeplessness is due to a decreased ability to concentrate rather than to changes in the capacity to process information or in motivation.

7604

Sutton, J.

ARE YOU READY?—*Flying Safety*, 13 (8): 24-25. Aug. 1957. DLC (UG633.F43, v. 13)

Physical and psychological factors have a direct bearing on flight performance. Trouble originates from prior dissipation, lack of sleep, sustained con-

centration, prolonged flying time without adequate rest, excessive time on instruments, and abnormal environmental conditions. A checklist of fatigue conditions is included which affect flying safety: temporary fatigue symptoms that are physical, mental, or psychological in origin, and chronic fatigue symptoms in all three areas. The presence of one or more of the symptoms listed does not necessarily mean fatigue, but indicates to members of the aircrew that a visit to the flight surgeon is warranted.

7605

Vidaček, S.

[EFFECT OF FATIGUE ON THE REPRODUCTION OF ARM MOVEMENTS AND STABILITY OF HAND PRESSURE] Utjecaj umora na reprodukciju pokreta ruke i stabilnost pritiska šake. — Arhiv za higijenu rada i toksikologiju (Zagreb), 8 (3): 229-234. 1957. In Croatian, with English summary (p. 234). DNLM

Reproduction of arm movements without visual control was tested in 16 subjects while at rest and while fatigued after physical work. No statistically significant differences were found. However, tests of maintaining pressure on a hand dynamometer showed a significant increase in mercury oscillations in states of physical or mental fatigue. (Author's summary, modified)

7606

Wacholder, K.

[IS FATIGUE A NON-SPECIFIC STRESS SYMPTOM RESULTING FROM THE RELEASE OF ACTH?] Müdigkeit, ein allgemeines Stress-Symptom infolge der Ausschüttung von ACTH? — Internationale Zeitschrift für angewandte Physiologie (Berlin), 16 (5): 361-364. 1957. In German. DNLM

Injection of a moderate amount of adrenocorticotrophic hormone produced in more than half of the subjects an extreme fatigue and lassitude. A third of the subjects, however, felt particularly refreshed. This corresponds to the individual differences in subjective well-being after moderate physical stress. This parallel also points out that general fatigue after physical work and its opposite, the feeling of refreshment, may be regarded as a stress-symptom due to ACTH release during physical work. (Author's summary)

k. Mental Stress

7607

Applezweig, M. A.

PSYCHOLOGICAL STRESS AND RELATED CONCEPTS: A BIBLIOGRAPHY.—Connecticut Coll., New London (Contract Nonr 995-02; Office of Naval Research Project no. NR 172-226). Technical Report no. 7, Dec. 1957. 185 p. AD 158 085 PB 136 221

This is a bibliography of 2611 references dealing with studies of anxiety, ego-involvement, frustration, breakdown, conflict, tension, fatigue, excessive stimulation, under-stimulation, extremes of deprivation or of environmental condition, pressure, emotional conditioning, etc. Effort is made to include papers dealing with methodology and with measurement of stress. The papers are arranged alphabetically.

7608

Funkenstein, D. H.,

S. H. King, and M. E. Drolette

MASTERY OF STRESS.—xv+329 p. Cambridge:

Harvard University Press, 1957.

DLC (QP356.F8, 1957)

Experiments are described on emotional and physiological reactions of 125 healthy college students during laboratory stress administered at weekly intervals. In addition to the laboratory stress experiments (chiefly frustration) a great variety of personality studies (both psychological and sociological) were carried out. Emphasis was placed on two phases of the stress reactions: the acute immediate emergency reactions, and the ability to master or failure to master stress on a time continuum. A theory is advanced that the acute emergency reaction represents an innate, deeply laid down aspect of personality, whereas the mastery or failure in mastery of stress is the result of the total life experience of the individual. Both the psychological and physiological changes shown by the subjects during stress and the various personality studies carried out during non-stressful situations are discussed as they support or fail to support this theory. (142 references)

7609

Kamin, L. J.,

and J. W. Clark

THE TAYLOR SCALE AND REACTION TIME.—Jour. Abnormal and Social Psychol., 54 (2): 262-263. March 1957. DLC (RC321.J7, v. 54)

A group of 67 basic airmen were tested for simple reaction time (SRT), reaction time motivated by avoidance of shock (ART), and score on the Taylor Manifest Anxiety Scale (A score). The higher the A score, the slower were both SRT and ART. The higher the A score, however, the greater was the increase in speed of reaction from SRT to ART conditions. (Authors' summary, modified)

l. Isolation and Sensory Deprivation

7610

Eilbert, L. R.,

and R. Glaser

PREDICTION OF ADJUSTMENT TO AN ISOLATED ENVIRONMENT [Abstract].—Amer. Psychologist, 12 (7): 450. July 1957. DLC (BF1.A55, v. 12)

Air Force personnel assigned to eight Arctic bases were divided into well-adjusted or poorly-adjusted groups according to supervisor evaluations. Variable analysis showed that the groups were differentiated by biographical history, self-appraisal, peer nominations, sick call rate, and proficiency test scores. It is suggested that past history of adjustment provides the best prediction of adjustment to an isolated environment.

7611

Grünthal, E.

[ON VISUAL HALLUCINATIONS DURING LONG OCCLUSION OF EYES] Über phantastische Gesichtsercheinungen bei langdauerndem Augenschluss.—Psychiatria et neurologia (Basel), 133 (4): 193-206. April 1957. In German. DNLM

A detailed description is given of the visual hallucinations observed by a patient while blindfolded for nine days after an eye operation. After presenting the known facts on this phenomenon to date, the author concludes that enforced bed-rest, relaxation, and occlusion of vision, rather than operation sequelae are responsible for appearance of hallucinations.

7612

Heron, W.

THE PATHOLOGY OF BOREDOM.—*Scient. American*, 196 (1): 52-56. Jan. 1957.

DLC (T1.S5, v. 196)

In a series of experiments prolonged exposure of subjects to an isolated, stimulus-free, monotonous environment produced definite deleterious effects. The individuals showed impaired thinking, childish emotional responses, disturbed visual perception, hallucinations, and brain-wave pattern changes. Normal brain activity depends on a continuing arousal reaction generated in the reticular formation, which in turn depends on constant sensory bombardment. It appears that sensory stimuli function to maintain this arousal, and lose the power to do so when restricted to monotonously repeated stimulation of an unchanging environment. A changing sensory environment seems essential for human beings.

7613

Klosóvskii, B. N.,

and E. N. Kosmarskaia

[TOTAL SIMULTANEOUS EXCLUSION OF VISUAL, AUDITORY, OLFACTORY, AND VESTIBULAR RECEPTORS IN ADULT ANIMALS] Polnoe odnomentnoe vykliuchenie zritel'nykh, slukhovykh, oboniatel'nykh i vestibuliarnykh retseptorov u vzroslykh zhivotnykh. —*Biulleten' eksperimental'noi biologii i meditsiny* (Moskva), 43 (3): 19-24. March 1957. In Russian, with English summary (p. 24).

DLC (R850.B55, v. 43)

The visual, auditory, olfactory, and vestibular receptors of one dog and 30 cats were totally removed in a single operation. Data were taken on the behavior and the duration of sleep and wakefulness of these animals for 7 months after the operation. In the dog sleep and wakefulness alternated in a slightly modified cycle and the duration of daytime sleep did not differ from normal. Awakening occurred spontaneously or was easily caused by touch. Cats, deprived of the same receptors, developed a state of profound sleep. Spontaneous awakening occurred only for urination or defecation and did not last longer than 1-2 minutes. The behavior of the cats after the operation is described. (Authors' summary, modified)

7614

Lobanova, L. V.

[MOTOR-DEFENSE CONDITIONED REFLEXES AFTER SUCCESSIVE EXCLUSION OF VISION, SMELL, HEARING, AND VESTIBULAR APPARATUS FUNCTIONS IN DOGS] Dvigatel'no-oboronitel'nye uslovnye refleksy pri posledovatel'nom vykliuchении zreniia, obonianiia, slukha, i funktsii vestibularnogo apparata u sobak. —*Doklady Akademii nauk SSSR* (Moskva), 115 (4): 837-840. Aug. 1957. In Russian. DLC (AS262.S3663, v. 115)

Following enucleation of the eyes, there was but little change in exteroceptor (cutaneous) and interoceptor (gastric) reflexes in dogs. Enucleation plus severance of the olfactory nerve produced only temporary changes manifested by repeated extensions of a leg between signals. Neither were there any changes following the above two procedures plus labyrinthectomy; however, enucleation, followed by labyrinthectomy and, thereafter, severance of the olfactory nerve decreased the conditioned reflexes (mainly motor) for some 3 weeks. Enucleation plus labyrinthectomy abolished the conditioned reflexes almost completely for about one month.

7615

Solomon, P.,

P. H. Leiderman, J. Mendelson, and D. Wexler
SENSORY DEPRIVATION: A REVIEW.—*Amer. Jour. Psychiatry*, 114 (4): 357-363. Oct. 1957.

DLC (RC321.A52, v. 114)

Sensory deprivation in varying degrees is discussed in the cases of Arctic and marine explorers, brain-washed prisoners of war, subjects of psychological experiments, and invalids confined to a tank-type respirator. The central factor noted in all cases is that the stability of man's mental state is dependent on adequate perceptual contact with the outside world. Common features noted in most cases of sensory deprivation are: intense desire for extrinsic sensory stimuli and bodily motion, increased suggestibility, impairment of organized thinking, oppression and depression, and, in extreme cases, hallucinations, delusions, and confusion. (Authors' summary, modified) (28 references)

7616

Vernon, J. A.,

and T. E. McGill

THE EFFECT OF SENSORY DEPRIVATION UPON ROTE LEARNING.—*Amer. Jour. Psychol.*, 70 (4): 637-639. Dec. 1957. DLC (BF1.A5, v. 70)

Lists of adjectives were presented auditorially to 9 subjects at intervals during sensory deprivation produced by confinement in a dark, soundproof room for 72 hours, and 48 hours after release. Comparison of scores on repetitive-trial tests of learning with those of control subjects revealed no significant difference in trials to criterion (one errorless trial) or errors to criterion between the two groups. During deprivation, subjects made significantly fewer overt errors, showed less fluctuation in recall of particular adjectives, and were significantly less variable. The differences shown during deprivation did not persist into the post-deprivation period.

m. Restraint

7617

Bartlett Jr., R. G.

RESTRAINT HYPOTHERMIA AND I¹³¹ UPTAKE BY THE RAT THYROID.—*Proc. Soc. Exper. Biol. and Med.*, 94 (4): 654-656. Apr. 1957.

DLC (QP1.S8, v. 94)

Rats restrained in a temperature of about 5° C. showed an I¹³¹ uptake in the thyroid higher at one hour and lower at 4 hours than the nonrestrained controls. The greatest uptake of I¹³¹ after four hours occurred at the lowest body temperature. Restrained hypothermic rats showed a significantly greater uptake of I¹³¹ by the thyroid than nonrestrained hypothermic controls. It is concluded that hypothermia of restrained animals can not be ascribed to depressed basal metabolism. (From the author's summary)

n. Radiations

7618

[ARE RADAR WAVES HARMFUL TO PERSONNEL ON RADAR DUTY?] Les ondes radar sont-elles nocives pour le personnel des postes de radar?—*Force*

aérienne, Service de santé, Bulletin technique d'information [Bruxelles], 1957 (Dec.): 2. In French. DNLM

Cases of accidents or disorders occurring in personnel exposed to radar waves previously reported in the literature appear to be inaccurate. No real physiopathological problems appear to be caused by radar apparatus, whose energy emission is very weak. The danger limit is fixed at a density of 10 microwatts per cm^2 . Further study is needed to determine the possible ionizing effects of radar apparatus.

7619

Claesson, S.,

G. Wettermark, and L. Juhlin
EFFECT OF ULTRA-VIOLET LIGHT ON MOUSE SKIN OVER A WIDE RANGE OF INTENSITIES.
— Nature (London), 180 (4593): 992. Nov. 9, 1957.
DLC (Q1.N2, v. 180)

A comparison was made of the effects of ultra-violet irradiation (wave length, about 300 $\text{m}\mu$) on the shaved skin of mice under the conditions of low intensity over a long period of time vs. high intensity for a shorter exposure period. Tissue damage was estimated by the leakage of intravenously injected Evans Blue into the irradiated areas. The minimum irradiation dose (intensity \times time) to cause tissue injury was almost constant over 10^7 -fold change of intensity.

7620

Derksen, W. L.,

T. D. Murtha, and T. I. Monahan
THERMAL CONDUCTIVITY AND DIATHERMANCY OF HUMAN SKIN FOR SOURCES OF INTENSE THERMAL RADIATION EMPLOYED IN FLASH BURN STUDIES. — Jour. Applied Physiol., 11 (2): 205-210. Sept. 1957. DLC (Q1.J72, v. 11)

The surface temperatures of painted and unpainted skin of four males were measured after exposures from 0.1 to 20.0 seconds at radiation levels of less than 1 $\text{cal./cm}^2/\text{sec}$. The thermal parameter of blackened skin, conductivity \times density \times specific heat, was determined as 8.6×10^{-4} centimeter-gram-second units. The surface temperature of unblackened skin when exposed to carbon-arc, to 3000° K tungsten, and to infrared radiation are approximately one-half those of blackened skin, and less than 30% of those computed from opaque-solid theory. Agreement between heat-flow theory and experiment is obtained if it is assumed that the skin is a homogenous diathermous solid with a diathermancy which varies with wavelength. (Authors' abstract, modified)

7621

Eugster, J.

[COSMIC RADIATION, ITS BIOLOGICAL AND CHEMICAL EFFECTS] Die kosmische Strahlung, ihre biologische und chemische Wirkung. — Zeitschrift für ärztliche Fortbildung (Jena), 51 (13): 565-567. July 1, 1957. In German. DNLM

Essentially the same as item no. 2717, vol. III.

7622

Eugster, J.

[ON THE BIOLOGICAL EFFECT OF COSMIC RADIATION AT HIGH ALTITUDES] Zur biologischen Wirkung der kosmischen Strahlung (KS) in grossen Höhen. — Raketentechnik und Raumfahrtforschung

(Stuttgart), 1 (3): 71-72. Oct. 1957. In German. DLC (TL780.R3, v. 1)

Research on high-altitude rocket flights has given evidence of the damaging effect of primary cosmic radiation on lower organisms. Direct hits by heavy primary nuclei were observed in clearly delineated skin areas in mice and in human skin grafts. Such direct hits occurred extremely rarely in accordance with the scarcity of heavy primaries at altitudes between 30 and 40 kilometers. However, there still remains the problem of how dangerous such direct hits could be to the brain or retinal cells, particularly at altitudes above the atmospheric envelope.

7623

Graul, E. H.

[RADIOBIOLOGICAL PROBLEMS OF SPACE FLIGHT] Radiobiologische Probleme der Raumfahrt. — Raketentechnik und Raumfahrtforschung (Stuttgart), 1 (2): 40-47. July 1957. In German. DLC (TL780.R3, v. 1)

The literature published within the last decade on the radiobiological problems of space flight is reviewed and discussed on the basis of direct and indirect research evidence. Ionizing radiation is classified in categories according to its chief biological effects. The importance of laboratory investigations of the effect of high-velocity heavy nuclei is emphasized for the evaluation of possible hazards in space. Several estimates are cited in regard to the total effect of space radiation on human beings in space flight, depending upon the duration of the flight. Planning for radiation protection covers also internal protection in an atomic-energy powered vehicle at some future time.

7624

Hendler, E.,

R. Crosbie, and J. D. Hardy
MEASUREMENT OF SKIN HEATING DURING EXPOSURE TO INFRARED RADIATION. — Naval Air Material Center. Air Crew Equipment Lab., Philadelphia, Pa. (Project no. NM 17 01 13.2). Report no. NAMC-ACEL-332, March 19, 1957. [27] p. AD 125 843 UNCLASSIFIED

A comparison is made between temperature changes occurring at the surface of living, human skin exposed to infrared radiation and changes predicted from theoretically derived heat-flow equations. A very sensitive radiometric device used to measure surface temperature is described and the mean value of "thermal inertia for surface heating" is calculated for the skin of exposed subjects. (Authors' abstract)

7625

Livshits, N. N.

[CONDITIONED REFLEX ACTIVITY IN DOGS UNDER LOCAL INFLUENCE OF A V.H.F. FIELD UPON CERTAIN ZONES OF THE CEREBRAL CORTEX] Uslownorefleksornai deiatel'nost' sobak pri lokal'nykh vozdeistviakh polem UVCH na nektorye zony kory bol'shikh polusharii. — Biofizika (Moskva), 2 (2): 197-208. 1957. In Russian, with English summary (p. 208). DLC (QH505.A1B53, v. 2)

English translation in: Biophysics (New York: Pergamon Press), 2 (2): 198-209. 1957.

DLC (QH505.A1B54, v. 2)

The action of very-high-frequency electromagnetic fields (7-55 watts, 50 megacycles) on different cortical areas in dogs caused reversible changes in conditioned reflex activity. In certain cases there was a

decrease in positive conditioned reflexes, while in some others there was a deterioration of discrimination. In two experiments a single exposure to a V.H.F. field brought about the above changes at various phases. The nature and the extent of the changes are determined by the constitutional type of each dog. The effective dose of exposure is likewise dependent on the individual. Exposure of the auditory area in dogs of a strong type resulted in changes related to the auditory analyzer only, while in weak-type dogs changes were noted in the conditioned reflexes from both the auditory and the visual analyzers, also lags in motor feeding reaction and food refusals increased in frequency. Exposure directed at the frontal lobes caused changes in the conditioned reflex activity controlled by different analyzers.

7626

Livshits, N. N.

[THE ROLE OF THE NERVOUS SYSTEM IN THE REACTIONS OF THE ORGANISM TO ULTRAHIGH FREQUENCY ELECTROMAGNETIC FIELDS] Rol' nervnoi sistemy v reaktsiyakh organizma na deistvie elektromagnitnogo polia ul'travysokoi chastoty. — Biofizika (Moskva), 2 (3): 378-389, 1957. In Russian. DLC (QH505.A1B53, v. 2)

Studies on the role of the nervous system in reactions of complex organisms to ultrahigh frequency electromagnetic fields (UHF) are reviewed. The reactions to UHF are composed of (1) local phenomena in organs and tissues caused by the direct action of UHF on cells and tissues, and of (2) reactions of the total organism brought about by nervous regulation. With respect to the thermal effects it has been possible to determine the degree of participation of each of these mechanisms in the final result and to show that nervous regulation plays a decisive role if the UHF field is not excessively strong. Similarly, there is evidence that the nervous system is the deciding factor in cardiovascular and gastrointestinal reactions to UHF. Reflex mechanisms are involved in the production of primary local effects as well as secondary whole-body responses; e.g., hyperglycemia under UHF which is absent in animals with denervated extremities. The direct action of UHF on different areas of CNS also contributes to the response of the whole organism. 96 references.

7627

McGuire, T. J.

HEALTH-PHYSICS PROCEDURES FOR AN AERO-MEDICAL RADIOISOTOPES LABORATORY.—Wright Air Development Center. Aero Medical Lab. Wright-Patterson Air Force Base, Ohio (Project no. 7160). WADC Technical Report no. 57-142, March 1957. vii+27 p. AD 118 113 PB 131 196

Iodine-131, Sodium-24, and Chromium-51 are the isotopes handled in tracer work involving studies on the effect of simulated altitude on laboratory animals. In order to achieve conditions where hazards are minimal; it is necessary to recognize the hazards, define safe working conditions, and to maintain these conditions. The latter point is critically important, and it involves training personnel in the necessary techniques, as well as educating them or at least impressing them with the importance of the imposed regulations. It is also necessary to provide adequate physical facilities for protection and monitoring and to enforce the necessary regulations. Recommendations are applicable to the installations setup, equipment selection, health monitoring, iso-

topes handling, personnel protection, waste disposal and decontamination. (Author's abstract, modified)

7628

Miura, T.,

M. Morioka, and K. Kimura

PHYSIOLOGICAL RESPONSE OF MEN TO RADIANT HEAT. II. EFFECT OF CLOTHING.—*Jour. Sci. and Labour* (Tokyo), 33 (8): 595-603, Aug. 1957. In Japanese, with English summary (p. 595-596). DNLM

The effect of radiant heat was studied on nude and clothed (cotton shirt) men in resting condition. The environmental temperature was controlled at 0, 10, and 20° C., respectively. In each experiment the chest of the subject was exposed for as long as one hour. The skin temperature of the chest, forehead, and abdomen rose but the skin temperature of the back and loin tended to fall owing to the increased heat loss. Mean skin temperature showed only a slight initial rise and then decreased when the effective temperature was 10° C., but it rose remarkably when the temperature was as high as 20° C. along with a rise in rectal temperature and an increase in heart rate. The protective effect of clothing from radiant heat was noticeable though only a cotton shirt was worn. The rise in rectal temperature and increased heart rate and extrarenal water loss were far less when clothed than when nude. (Authors' summary, modified)

7629

NUCLEAR PLANE CREW HAZARD MAY BE LESS THAN SUPPOSED.—*Aviation Week*, 66 (25): 68, 71. June 24, 1957. DLC (TL501.A8, v. 66)

Data are given from several papers presented at the annual meeting of the Aero Medical Association in Denver, Colo., relating to studies on: (1) radiation hazard to crews of nuclear-powered aircraft as it relates to nuclear-powered airplane design, (2) decompression sickness, and (3) landing injuries, including a description of a new type restraint harness. Other data presented concern human habitation of Mars and pressure suits.

7630

Pervushin, V. IU.

[CHANGES OF THE CARDIAC NERVOUS APPARATUS DUE TO ACTION OF THE ULTRAHIGH-FREQUENCY FIELD] Ob izmeneniyakh v nervnom apparate serdtsa pri vozdeystvii sverkhvysokochastotnogo polia.—*Biulleten' eksperimental'noi biologii i meditsiny* (Moskva), 43 (6): 87-92, June 1957. In Russian, with English summary (p. 92). DLC (R850.B55, v. 43)

Four cats were subjected to an ultrahigh-frequency electromagnetic field for periods of 2-10 hours. Two cats exposed to an intensity of 0.03 w./cm.² developed hyperthermia, the other two exposed to a lesser intensity of 0.005-0.01 w./cm.² did not develop hyperthermic reactions. Histological preparations show that the afferent neurones of the heart are the first to be affected by the ultrahigh-frequency field. The receptor fibres of sensory endings, mainly the preterminal sections, are most severely damaged. Altered neurons can be seen in the spinal cord ganglia (Th₁-Th₃) and the vagus ganglia. No alterations were seen in the autonomic cardiac centers. The findings confirm the assumption of intense sensitivity of the afferent neurons to chronic effects of the ultrahigh-frequency field. (Author's summary, modified)

7631

Presman, A. S.

[TEMPERATURE CHANGES OF THE HUMAN SKIN IRRADIATED WITH CENTIMETER WAVES OF LOW INTENSITY] *Izmenenie temperatury kozhi cheloveka pri obluchenii santimetrovymi volnami maloi intensivnosti.*—*Biulleten' eksperimental'noi biologii i meditsiny* (Moskva), 43 (2): 51-55. Feb. 1957. In Russian, with English summary (p. 55).
DLC (R850,B55, v. 43)

Eleven-centimeter microwaves of intensities of 5-35 mw/cm² were used in this study. Temperature rise in the skin was found to take place only at intensities higher than 5 mw/cm². The temperature attains its maximum (for a given microwave intensity) in 10-25 minutes of irradiation, remaining at this level afterwards. The maximum endurable intensity was 600-800 mw/cm².

7632

Schaefer, H. J.

COSMIC RAY DOSAGE DURING THE GIANT SOLAR FLARE OF FEBRUARY 23, 1956.—*Naval School of Aviation Medicine, Pensacola, Fla.* (Project no. NM 12 01 11, Subtask 1), Report no. 14, June 11, 1957. ii+19 p. AD 141 352 UNCLASSIFIED
Also published in: *Jour. Aviation Med.*, 28 (4): 387-396. Aug. 1957. DLC (RC1050.A36, v. 28)

The available cosmic ray data collected during the February 1956 solar flare are reviewed and evaluated with regard to the extra-atmospheric tissue ionization dosage. World-wide sea level neutron recordings at different magnetic latitudes allow inferences about this dosage. The integral extra-atmospheric flare dose shows an extremely strong dependence on latitude. While it is less than 1 millirad below 42°, it grows to 1 rad at 55°. Beyond that point extrapolation is uncertain. Various speculative possibilities for such extrapolation are discussed. Clues on the flare-produced heavy nuclei flux and beta, X-, and gamma rays are lacking. (Author's abstract)

7633

Shepherd, L. R.

COSMIC RADIATION AND SPACE-FLIGHT.—In: *Space research and exploration*, p. 71-85. Ed. by D. R. Bates et al. London: Eyre & Spottiswoode, 1957. DLC (TL790.B3)

Crews of high-altitude aircraft or of space rockets are exposed to the hazards of cosmic rays. The most significant particles, in so far as biological damage is concerned, are the heavy cosmic-ray primaries and possibly the evaporation particles from nuclear collisions. Assessment of the biological effectiveness of the radiations is uncertain, and types of damage envisaged are long-term ones, accumulating gradually over periods of weeks or years. Exposures of a few days or even weeks to levels of radiation above the accepted tolerances may have no serious consequences, but more prolonged exposures may not be safe. For shielding purposes, it is postulated that materials of low atomic weight may be effective in stopping cosmic-ray particles.

7634

Shepherd, L. R.

THE POSSIBILITY OF COSMIC RAY HAZARDS IN HIGH ALTITUDE AND SPACE FLIGHT.—In: *Realities of space travel*, p. 231-250. Ed. by L. J. Carter. London: Putnam, 1957. DLC (TL790.A1B718)

Same as item no. 2088, vol. II (1953).

o. Magnetic and Electric Fields

7635

Stroikova, K. V.,

1957

and T. I. Belliaeva

[THE EFFECT OF A HIGH-VOLTAGE, LOW-FREQUENCY ELECTRIC FIELD ON THE LEVEL OF HIGH-ENERGY PHOSPHATE CONTENT IN SKELETAL MUSCLES OF WARM-BLOODED ANIMALS] *Vliianie elektricheskogo polia vysokogo napriazhenia nizkoi chastoty na uroven' makroergicheskikh fosfornykh soedinenii v skeletnoi myshitse teplokrovnykh zhivotnykh.*—*Fiziologicheskii zhurnal SSSR* (Moskva), 43 (5): 469-472. May 1957. In Russian. DLC (QP1.F57, v. 43)

The stiffening of the tail muscles in mice, induced by Tank's method, was used as an indirect test in studying the metabolism of high-energy phosphorus compounds. After the first exposure to a high-voltage, low-frequency electric field, the stiffening time was short, ranging from 6 to 10.6 minutes, while that in the control group was 23.5-27.0 minutes. Upon repeated exposure to the electric field, the stiffening time increased, indicating a change in the metabolic processes which permitted some compensation.

p. Posture

7636

Aull, J. C.,

and W. M. McCord

EFFECTS OF POSTURE AND ACTIVITY ON THE MAJOR FRACTIONS OF SERUM PROTEIN AS DETERMINED BY THE PHOSPHATE TURBIDITY METHOD.—*Amer. Jour. Clinical Pathol.*, 27 (1): 52-55. Jan. 1957. DLC (RB1.A3, v. 27)

The mean grams per 100 milliliters of the major serum protein fractions obtained from forty normal adults were as follows: total protein, 7.24 grams per 100 milliliter; albumin, 4.25 g. (58.7%); alpha globulins, 1.01 g. (14.0%); beta globulin, 1.1 g. (15.9%); gamma globulin, 0.83 g. (11.5%). Erect posture and activity resulted in increased concentrations of serum protein, without altering the percentage of the components. Individual variations and the interrelation of posture with activity are also discussed.

7637

Dickson, J. A.

THE EFFECT OF LIMB POSITION ON THE VASODILATOR RESPONSE TO COLD IN THE FINGER.—*Jour. Physiol. (London)* 135 (1): 93-97. Jan. 1957. DCL (QP1.J75, v. 135)

Heat elimination from the fingers placed at different heights above and below the sternal notch was studied by immersion of the fingers into water at 0-4° C. Elimination decreased progressively from 4 to 55 cm. above the sternal notch. The arterial perfusion pressure at the maximum elevation was reduced to 40 mm. Hg. It is concluded that the decreased heat elimination is a function of the reduction of perfusion pressure as the arm is elevated.

7638

Reed, E. A.

1957

EFFECT OF POSITION OF THE BODY ON ALVEOLAR GAS COMPOSITION [Abstract]. —

Federation Proceedings, 16 (1, part I): 106. March 1957.

DLC (QH301.F37, v. 16)

Anesthetized dogs were placed on a tilt board. While breathing air, the animal was tilted alternately head down and head up 30°. In 14 experiments on 7 dogs the following average data on alveolar carbon dioxide, alveolar oxygen, respiratory frequency, and minute volume were found:

	Head Up	Head Down	% Diff.
Al. CO ₂	6.96%	6.43%	-8
Al. O ₂	11.70%	12.64%	8
Resp. freq.	16.3/min.	25.5/min.	56
Min. vol.	2,376 ml.	3,054 ml.	28

7639

Buskirk, E. R.,

1957

**P. F. Iampietro, W. P. Beetham, and D. E. Bass
INFLUENCE OF HEAT ACCLIMATIZATION AND PHYSICAL CONDITIONING ON WORK PERFORMANCE AFTER DEHYDRATION [Abstract]. —**

Federation Proceedings, 16 (1, part I): 18. March 1957.

DLC (QH301.F37, v. 16)

Three groups of five men each were dehydrated overnight in the heat (115° F.), on two occasions (D₁ and D₂), by approximately 5.5% of their starting body weight. During the three-week period between D₁ and D₂, one group (AC) was acclimatized to heat and physically conditioned; a second group (C) was conditioned; the third group (S) was sedentary. The ability to work after dehydration was assessed by the following criteria: "maximal" oxy-

gen consumption (V_{O₂}), pulse rate (P) and rectal temperature (T_r), made at appropriate intervals. Dehydration produced a decrement in V_{O₂} equal for all groups at D₁ and D₂. V_{O₂} increased with conditioning in Groups AC and C. Thus, V_{O₂} at D₂ was higher than at D₁, for groups AC and C. Walking P and recovery P after work were lower at D₂ than at D₁, in Groups AC and C, but not in Group S. The elevation in T_r with walking and running was the same at D₁ and D₂. Physical conditioning enhanced work performance during dehydration, whereas acclimatization to heat did not appear to supplement this effect. (From the authors' abstract)

q. Others

7640

[DANGER OF FLIGHT ON AN EMPTY STOMACH]

Danger des vols à jeun. — Force aérienne, Service de santé, Bulletin technique d'information [Bruxelles], 1957 (May): 27. In French.

DNLM

A case is reported of a pilot who after a light meal in the morning flew throughout the day without eating and became ill. Clinical examination proved negative, but the electrocardiogram showed several modifications. A later electrocardiogram taken after he had eaten dinner was found to be normal. Since the quantity of blood sugar is decreased to a high degree after fasting for 8 or 16 hours, hypoglycemia was suspected. The danger of flying on an empty stomach is stressed, as hypoglycemic coma may result and lead to fatal consequences.

7. PERSONNEL

[General psychological aspects under 5]

a. General

7641

Beyer, D. H.,
and S. B. Sells
SELECTION AND TRAINING OF PERSONNEL FOR
SPACE FLIGHT.—*Jour. Aviation Med.*, 28 (1): 1-6.
Feb. 1957. DLC (RC1050.A36, v. 28)

Space crew selection must be based on the following criteria: (1) aptitude and skill requirements including expert knowledge and proficiency in piloting high-performance aircraft and knowledge and proficiency in mathematics, engineering, and navigation; (2) biological and physical requirements (those set for today's jet pilots being the minimum); and (3) psychological adaptability and characteristics of motivation, cooperation, and adventurousness. Several years of training will be necessary involving three phases: ground school, simulator training, and transition flight training.

7642

Graybiel, A.
LONG-RANGE STUDIES OF NAVAL AVIATORS.—
Office of Naval Research, Research Rev., 1957
(Aug.): 15-21. DLC (Q180.U5A354, 1957)

Follow-up analyses of medical, psychological, and performance data on naval aviators are presented. They include the Pensacola Study on 1056 (88 officers and 968 cadets) aviators begun in 1940, the 1950 to 1952 Follow-up Study, and the 1957 to 1958 Follow-up Study. Through the extension of such long-range studies, it is hoped that more will be learned about the medical and psychological problems of the naval aviators and what might be done to solve them.

b. Selection, Classification and Rating

[Physical examination under 8-f]

7643

Bathias,
and Grousset
[MEDICAL-PSYCHOLOGICAL SELECTION AND
SUPERVISION OF PILOTS AND NAVIGATING
PERSONNEL OF THE FLEET-AIR ARM] *Sélection
et surveillance médico-psychologique des pilotes et
du personnel navigant de l'aéronautique navale.*—
*Bulletin international des Services de santé des
armées des terres de mer et de l'air (Liège)*, 30 (12):
523-536. Dec. 1957. In French, with English sum-
mary (p. 523-524). DLC (RC970.B77, v. 30)

All candidates for positions as pilots, navigators, or traffic control operators in the French Fleet Air-Arm are examined at the Center for the Medical Examination of the Navigating Personnel of the Fleet Air-Arm at Toulon. This center has two sections: a medical section which assesses the medical and physiological condition of the candidates and an orientation section for Air-Force personnel (SOP Aero) which assesses the psychological and personality potential. Standard methods for medical selection include physical examination for pathological conditions and sensory tests such as response to

hypoxia. Psychological examinations study intellectual characteristics and psycho-motor potentials. Basic psychomotor tests, questionnaires, and electroencephalograms are used to determine aggressiveness, personality, anxiety, and mental aptitudes. (Authors' summary, modified)

7644

Borg, W. R.
COMPARISON OF OFFICERS FROM DIFFERENT
SOURCES OF COMMISSION.—*Psychol. Reports*,
3 (3): 313-315. 1957. DLC (BF21.P843)

All officers graduating in one class from the Air University Squadron Officers School were grouped according to source of commission and compared on the basis of intelligence, instructor evaluations, peer ratings, and pre-instruction knowledge of subjects covered in the Squadron Officers course. The only group showing consistent superiority were officers from the military academies. Among other groups, the Officer Candidates School graduates rated highest in peer ratings, and the Reserve Officers Training Corps graduates in intelligence and knowledge. Directly-commissioned officers rated lowest in half the categories measured, but differences were small. Low positive correlations were found between rank and scores in the areas studied. With the exception of academy graduates, no evidence was found that officers from one source of commission were generally superior to any other group after a year or more of field experience.

7645

Brehman, G. E.
A NOTE ON THE RELATIONSHIP OF THE INTER-
ACTION POTENTIAL INVENTORY TO PEER RAT-
INGS OF LEADERSHIP AND OTHER NAVAL AVIA-
TION CADET CRITERIA.—*Tulane Univ.*, New
Orleans, La.; issued by Naval School of Aviation
Medicine, Pensacola, Fla. (Project no. NM 14 02 11,
Subtask 1). Report no. 21, Feb. 13, 1957. 3 p.

UNCLASSIFIED

The Interaction Potential Inventory (IPI) was administered to 257 Naval aviation cadets upon their entering pre-flight training. Peer ratings of leadership potential and pre-flight grade averages, along with a personal history questionnaire, were obtained at the conclusion of the 15-week training period. The relationship between the criteria of part-time work or college leadership and the scales of the IPI confirmed previous findings. It was also concluded that peer ratings of leadership potential were not determined by the personality aspects tapped by the IPI; and that the relationship between college subject failure and the IPI and the lack of a similar relationship between the IPI and high school standing may indicate that the IPI is related to a factor, or factors, uniquely determining college success. The apparently contradictory findings with regard to pre-flight grade average and college subject failure may be due either to chance or to the possibility of a real difference between the determiners of these two criteria.

7646

Brokaw, L. D.,
and G. G. Burgess
DEVELOPMENT OF AIRMAN CLASSIFICATION

BATTERY AC-2A.—Air Force Personnel and Training Research Center, Lackland Air Force Base, Tex. (Project no. 7700, Task no. 77008). Technical Report no. AFPTRC-TR-57-1. June 1957. vi+38 p. AD 131 422 PB 132 151

The new Airman Classification Battery AC-2A includes a regrouping of specialties into new aptitude clusters on the basis of mathematical analysis rather than through the judgment of job analysts. The following 5 indexes are used: mechanical aptitude index; administrative aptitude index; radio operator aptitude index; general aptitude index, and electronics aptitude index. The intercorrelations of the 5 indexes range from -.02 to .81 with a median of .57. The reliabilities range from .87 to .93 with a median of .91. The aptitude indexes are reported in a percentile-type score with the potential range of talent broken into 20 equal sections, each designated by a number indicating the proportion of the group achieving lower scores than that section, e.g., a score of 95 is the highest possible score.

7647

Burwell, R. R.

HISTORICAL REVIEW OF AIRCREW SELECTION: DEVELOPMENT OF PSYCHOLOGIC SELECTION OF PILOTS IN THE UNITED STATES AIR FORCE AND PREDECESSOR ORGANIZATION IN THE UNITED STATES ARMY.—School of Aviation Medicine, Randolph Air Force Base, Tex. Review no. 1-58, Sept. 1957. 24 p. AD 152 904 PB 135 491

A historical review (covering the period from the beginning of powered flight to the present) is presented of the research and development of psychologic selection methods (preceded by a brief tracing of purely physical-examination selection methods) in the United States Air Force and its predecessor Army organization, with particular reference to pilot selection. Although testing techniques for selecting men who fly and the science of quantitative and qualitative pilot selection have matured and proved their worth, the attrition rate for men in training (as well as experienced pilots from the Air Force) continue to be a matter of great concern.

7648

CAA FLIGHT SURGEON PROPOSES "MODERN" PHYSICAL EXAMS FOR CIVILIAN PILOTS.—Amer. Aviation, 21 (15): 30. Dec. 16, 1957.

DLC (TL501.A675, v. 21)

A revision of current Civil Aeronautic Administration's (CAA) physical examinations for pilots and a system of limited physical certification is proposed by Dr. James H. Britton, regional flight surgeon for CAA's Fourth District. A modern program of study and evaluation could determine a pilot's job description. The exact physical qualifications a civil pilot must have could then be assessed. A standards board would be able to determine whether physical defects such as color blindness and amputations should preclude certification. Proficiency in flying is the final answer and new methods must be developed to test the aptitude to fly. It is unfortunate that most civil standards are taken from military requirements because civil problems are different.

7649

Campbell, D. T.

INTERCORRELATIONS AMONG LEADERSHIP CRITERIA FOR A POPULATION OF AIR FORCE INSTRUCTORS.—Chicago Univ., Illinois (Contract AF 18(600)-170); issued by Air Force Personnel and

Training Research Center, Lackland Air Force Base, Tex. (Project no. 7713, Task no. 77227). Research Report no. AFPTRC-TN-57-90, June 1957. v+5 p. AD 134 233 PB 132 298

The ratings from Officer Effectiveness Reports (OERs), even when obtained by combining those from different bases and different reporting officers, had substantial reliability. The composite scores from OERs correlated significantly with the research ratings from the supervisors of instructors and from their cadet students. (Author's conclusions)

7650

Eilbert, L. R.,

R. Glaser, and R. M. Hanes

RESEARCH ON THE FEASIBILITY OF SELECTION OF PERSONNEL FOR DUTY AT ISOLATED STATIONS.—American Inst. for Research, Pittsburgh, Pa. (Contract AF 41(657)-74); issued by Air Force Personnel and Training Research Center. Personnel Lab., Lackland Air Force Base, Tex. (Project no. 7776, Task no. 67612). Technical Report no. AFPTRC-TR-57-4, July 1957. vii+47 p. AD 134 241 PB 136 223

Prediction criteria and variables were investigated of personal adjustment of airmen by analyzing the test scores of 648 men and the recorded interviews of 213 men assigned to eight isolated Arctic bases. Findings indicate the availability of measures which can concurrently differentiate good and poor adjustment to an isolated Arctic environment. The variables which differentiated the criterion groups appear to be based on personality and background characteristics that may be of long standing and relatively independent of the conditions of Arctic isolation. Results of the study suggest that a man's history of adjustment may be the best predictor of his adjustment to an isolated Arctic environment. (32 references)

7651

Evrard, E.

[TRIAL APPLICATION OF THE BOURDON-WIERSMA TEST IN THE DETERMINATION OF APTITUDE OF FLYING AVIATORS] Essai d'application du test de Bourdon-Wiersma dans la détermination de l'aptitude au vol des aviateurs.—In: The first European congress of aviation medicine, p. 21-32. Aeromedica acta (Soesterberg, Netherlands), Special edition, 1957. In French. DNLN

Also published in: Médecine aéronautique (Paris), 12 (1): 69-79, 1957. In French, with English summary (p. 79). DLC (TL555.M394, v. 12)

The Bourdon-Wiersma test for measuring attention was administered to 758 pilot candidates. Usable results were obtained for only 355 subjects. The test was found to be of considerable value for psychological selection testing of aviators provided it was used as an elimination test below a threshold score of 51. It may serve to eliminate about 10% of the candidates with reduced chances of successful completion of training. It may not replace existing tests but can serve as a useful adjunct to them. Test results are conclusive in pilots suffering from fatigue when the score falls below 50. A normal score is obtained where simple anxiety is involved.

7652

Fruchter, B.,

R. R. Blake, and J. S. Mouton

SOME DIMENSIONS OF INTERPERSONAL RELA-

TIONS IN THREE-MAN AIRPLANE CREWS.—
Psychol. Monographs, 71 (19): 1-19. 1957.
DLC (BF1.P8, v. 71)

A Crew Interaction Scale containing 44 items derived from various sources was administered to 30 Air Force B-47 crews. The items required ranking by each crew member of himself and other crew members in various areas of performance and intra-crew relations, and evaluation by each member of the crew as a whole. Analysis of inter-rater reliability indicated agreement among ratings given to crews and their members, and satisfactory discrimination in the average ratings for different crews. Comparison of each item with a performance criterion based on rankings of crews by the Wing Standardization Board and squadron commanders revealed a significant relation in many cases at or below the 20% level of confidence. Analysis of rating interrelationships permitted the identification of 5 reliable, independent scales representing technical competence, leadership, morale, crew coordination, and cooperation. The scale for technical competence had a significant positive relationship to the performance criterion, while the leadership and crew coordination scales were negatively related to performance. It is concluded that direct intra-crew assessments represent an effective method for the measurement of crew relations and for the prediction of crew efficiency.

7653

Knight, L. A.

JOB REQUIREMENTS AND MATCHING STANDARDS.—In: Symposium: physical standards and selection, p. 140-145. Randolph Air Force Base, Tex.: Air University, 1957. AD 144 144

UNCLASSIFIED

Military flying has become divided into several highly specialized vocations. Because of the advance of technology and the increased variety of Air Force missions, some of these flying jobs impose stresses upon the pilot and aircrew which cannot be eliminated. Selection should attempt to provide that the men who fill these jobs are the ones most qualified physically to do so. This would seem to call for the development and use of test instruments capable of quantifying reaction under selected conditions of stress. Selection is seen as a formal, progressive procedure, occurring at intervals throughout the individual career. The factors considered at each interval should be related to the criteria of the job for which selection is being made. Such a system of step-wise selection could be expected to provide an economical utilization of the manpower available. (From the author's summary)

7654

Kraus, R. N.

EAR, NOSE, AND THROAT STANDARDS.—In: Symposium: physical standards and selection, p. 71-76. Randolph Air Force Base, Tex.: Air University, 1957. AD 144 144

UNCLASSIFIED

The ear, nose, and throat history and examination is performed to select crew members who are able to perform adequately the functions of respiration, communication, orientation, ventilation, and mastication. Some suggestions are made to facilitate better selection and utilization of crew members. These suggestions relate to the advisability, inadvisability, or adequacy of the use of sinus X-rays, systematic cortisone, and pure-tone threshold audiograms, respectively, and difficulties in the differential diagnosis of

true vertigo. Ear, nose, and throat standards are quite adequate for selection now and in the future provided the history and examination are carefully performed.

7655

Mebane, J. C.

PSYCHIATRIC STANDARDS.—In: Symposium: physical standards and selection, p. 108-122. Randolph Air Force Base, Tex.: Air University, 1957. AD 144 144

UNCLASSIFIED

Present psychiatric standards are discussed and changes which should be made in the manner in which these are set forth are indicated. The standards themselves, where they are based on diagnosed psychiatric conditions, are well founded. When psychiatrists are prompted to disqualify an applicant in the borderline category, the basis for their decision is complex. The reason why some borderline individuals fail and others succeed warrants further research. The inadequacies are stressed of the interview as an efficient method of adaptability screening, particularly on the numerical scoring system still in use. The picture is not all black, however. The addition of psychological tests to the assessment of fitness for flying will enrich clinical data and sharpen decisions. Psychological tests, if properly understood and applied, will aid in more effective maintenance of flying personnel. (From the author's conclusions)

7656

Milch, L. J.

SERUM LIPOPROTEIN AND PILOT SELECTION.—In: Symposium: physical standards and selection, p. 46-51. Randolph Air Force Base, Tex.: Air University, 1957. AD 144 144

UNCLASSIFIED

Discussions are presented on the feasibility of identifying individuals with an extraordinary predisposition to coronary artery disease. The advantages and disadvantages of this procedure are also discussed. The use of blood serum lipoprotein concentrations for such a testing system is investigated including lipoprotein identification, measurement, its relation to, and difference from, blood cholesterol measurement, and the mode of validating the system. It is concluded that physical selection on the basis of coronary risk is desirable, based on its contribution to personnel, fiscal, and combat economy, but that to require an individual to meet a standard in support of flying status or continued service is, at present, premature and may prove to be unrealistic.

7657

Mundy, J. P.,

L. G. Goldstein, and A. G. Bayroff

DEVELOPMENT OF THE ARMED FORCES QUALIFICATION TEST, FORMS 5 AND 6.—Adjutant General's Office (Army). Personnel Research Branch, Washington, D. C. (Army Project no. 29560000). PRB Technical Research Report no. 1101, April 1957. 23 p. AD 141 282 PB 130679

Forms 5 and 6 of the Armed Forces Qualification Test (AFQT) were developed through the joint efforts of all Services to replace AFQT-3 and -4 as the primary screening instrument used at Armed Forces Examining Stations. Tables for converting raw scores to percentiles were furnished. The new forms were developed to be parallel to AFQT-3 and AFQT-4 with respect to item content, test length, time limit, and test format. Analysis of the new

forms proved them to be superior to the earlier forms with respect to equivalence, difficulty of individual items, and reliability over the entire range of scores. It was thus concluded that the new forms were superior to earlier forms for the purpose of measuring mental ability of applicants for enlistment and Selective Service registrants and for the allocation of men to be selected among the Services. (Authors' summary and conclusions)

7658

Powell, W. H.

THE PHILOSOPHY OF PHYSICAL STANDARDS FOR MILITARY SERVICE.—In: Symposium: physical standards and selection, 5-14. Randolph Air Force Base, Tex.: Air University, 1957. AD 144 144

UNCLASSIFIED

Various broad personnel selection standards are discussed as they relate to the Air Force in particular and military service in general. These include the following aspects which constitute the philosophy of military selection standards: (1) the type physique required to operate a particular type missile; (2) physical, mental, and emotional stamina to withstand the rigor of war; (3) the lowering of general service standards in time of national emergency; (4) the growing complexity of warfare with greater emphasis on brain over brawn; and (5) the emotional and moral caliber of the recruit. Three responsibilities of the medical profession are meeting, maintaining, and invoking the standards imposed. The medical profession is challenged to provide the balance wheel in maintaining realistic and effective standards of medical performance for every member of the Air Force population.

7659

Randel, H. W.,

I. T. Taylor, and L. S. Burnett

FURTHER STUDIES OF MEDICAL ASPECTS OF PARTIAL PRESSURE SUIT INDOCTRINATION.—*Jour. Aviation Med.*, 28 (2): 134-141. April 1957.

DLC (RC1050.A36, v. 28)

A series of 326 individuals was processed for indoctrination in the Air Force partial-pressure suit and accessory equipment. The indoctrination procedure included a physical examination, explanation and demonstration of equipment, and actual practice in the use of the equipment, consisting of pressure breathing at ground level, slow ascent to 65,000 feet and rapid decompression from 40,000 feet to 65,000 feet. Forty disqualifications from among the 326 indoctrinees gave a disqualification rate of 12.2 per cent. By adding the disqualification rate of 12.2 per cent and the abortion rate of 8.3 per cent, an over-all "failure rate" of 20.5 per cent is obtained. (Authors' summary)

7660

Rosenberg, S.

METHODS FOR THE RATIONAL ASSEMBLY OF AIR CREWS.—*Jour. Aviation Med.*, 28 (2): 185-189. April 1957.

DLC (RC1050.A36, v. 28)

Studies have been made utilizing self-selection among potential air crew members whereby they chose each other on the basis of some interpersonal contact. Other studies suggest that high similarity of interests and attitudes would produce more compatible crews. Personality variables, on the other hand, seem to require combinatorial methods more complex than similarity. Finally there is some evidence that the distribution of technical skills relates to

crew performance. From this evidence a number of interesting concepts concerning distribution of technical skills have been developed which may be useful in crew assembly in new systems. (Author's summary, modified.)

7661

Timbretti, C.

[APTITUDE SELECTION OF FLYING PERSONNEL AND SPECIALISTS OF THE AIR FORCE] Selezione attitudinale del personale aeronavigante e specialisti dell'A.M.—*Rivista aeronautica* (Roma), 33 (1): 65-76. Jan. 1957. In Italian. DLC (TL504.R54, v. 33)

The use of psychometric methods as a criterion for the selection and orientation of flying personnel and aviation specialists in the Italian Air Force is discussed in terms of the present inefficiency of both psychological and clinical tests, substitution of one method for the other, and the possible integration or complementing of the two methods. No perfect or efficient method for aptitude testing of flying personnel appears to exist, and there is no correlation or subordination of one test for another.

7662

Tupes, E. C.

A PROPOSAL FOR AN OFFICER EFFECTIVENESS SELECTION BATTERY BASED ON MEASURES OBTAINABLE DURING BASIC AND ADVANCE AFOTC.

—Air Force Personnel and Training Research Center, Lackland Air Force Base, Tex. (Project no. 7719, Task no. 17009). Development Report no.

AFPTRC-TN-57-87, June 1957. v+8 p. AD 134 207
PB 129 671

An officer effectiveness selection battery could be assembled which would be valid for the measurement of officer effectiveness and suitable for use in the Air Force Reserve Officer Training Course (AFOTC) program and, with some modification, in other officer selection programs. This battery would consist of five types of procedures: (1) a standardized country-wide evaluation system based primarily on ratings by peers, cadet officers, and staff officers; (2) ratings by peers on a number of personality traits; (3) a comprehensive biographical-interest-personality inventory based on presently available items of demonstrated validity; (4) a physical proficiency test battery; and (5) a situational performance test series. (Author's conclusions) (20 references)

7663

Tupes, E. C.,

and R. E. Christal

PSYCHOLOGICAL TESTS AND THE SELECTION AND CLASSIFICATION OF AIR FORCE OFFICERS.—Air Force Personnel and Training Research Center, Lackland Air Force Base, Tex. (Project no. 7719, Task no. 17009). Report no. AFPTRC-TN-57-52, April 1957. v+16 p. AD 126 383
PB 153 572

Aptitude tests have proved highly effective as a means of selecting Air Force officer personnel. They are generally used in officer selection programs but are not yet fully exploited in officer classification. As appropriate instruments are developed, wider use can be made of aptitude tests in the classification of officers. Development of motivation and personality tests related to proficiency in specific job areas may increase precision of officer classification and, perhaps, add to the effectiveness of officer selection programs. (Authors' conclusions) (75 references)

7664

Tupes, E. C.
RELATIONSHIPS BETWEEN BEHAVIOR TRAIT RATINGS BY PEERS AND LATER OFFICER PERFORMANCE OF USAF OFFICER CANDIDATE SCHOOL GRADUATES.—Air Force Personnel and Training Research Center, Personnel Lab., Lackland Air Force Base, Tex. (Project no. 7719, Task no. 17009). Research Report no. AFPTRC-TN-57-125, Oct. 1957. vi+34 p. AD 134 257 PB 135 903

Peer ratings on 30 personality traits (each validated separately against OCS Military Grades, OCS Academic Grades, and later Officer Effectiveness Reports or OERs) were obtained for candidates in each of six Officer Candidate School classes in an effort to identify variables important to successful on-the-job performance of officers and to develop measures of these variables useful in selection. A majority of the personality trait ratings were found to have substantial validity against each criterion. A multiple correlation between a reduced number of traits and OERs was highly significant. Validities against OERs of a trait rating composite were as high or higher than the validities of a more global rating of leadership potential (the Military Grades) or of achievement as measured by Academic Grades. When the trait rating composite was combined with Academic and Military Grades, the validity against OERs of the combination was higher than the validity of either alone. Personality trait ratings, at least as obtained in the present study, are related to later successful on-the-job performance of officers, could possibly very profitably be incorporated into the OCS grading system, and form a basis for an early weeding out of OCS candidates. (From the author's summary)

7665

Voas, R. B.,
J. T. Bair, and R. K. Ambler
VALIDITY OF PERSONALITY INVENTORIES IN THE NAVAL AVIATION SELECTION PROGRAM.—Naval School of Aviation Medicine, Pensacola, Fla. (Project no. NM 16 01 11, Subtask 1). Report no. 13, Nov. 15, 1957. iii+[37] p. UNCLASSIFIED

This study related a number of standard personality tests to two types of problems arising in flight training: (1) maladjustment of some cadets to military life, and (2) the development of disabling fear reactions to flying. Various scales from the MMPI demonstrated low but significant correlation with the military adjustment criterion. The findings regarding the fear reaction criterion indicate that certain standard anxiety scales are of no predictive value but are primarily useful as indicators of the concurrent status of the individual. Therefore, they could be useful in identifying individuals for early elimination or for special counseling. (Authors' abstract) (24 references)

7666

Vries, E. de
[AEROMEDICAL TESTING AND STRESS TOLERANCE OF THE CENTRAL NERVOUS SYSTEM]
Vliegmedische keuring en de belastbaarheid van het centraal zenuwstelsel.—Nederlands militair geneeskundig tijdschrift ('s-Gravenhage), 10 (1): 18-29, January 1957. In Dutch. DLC (RC971.N4, v. 10)

The psychological selection of fliers is discussed in view of recent developments in psychiatry, neurophysiology, neurobiochemistry, and electroencephalography. Selection of superior applicants may be

best achieved by an approach combining psychological exploration of attitudes and motivation for flight with neurophysiologically and biochemically determined indices of individual capacity for withstanding flight stresses, physical as well as emotional.

7667

Witwer, R. G.
FLIGHT INDOCTRINATION PROGRAM AT A UNITED STATES MARINE CORPS AIR STATION.—U. S. Armed Forces Med. Jour., 8 (7): 1017-1021, July 1957. DLC (RC970.U7, v. 8)

In order to cut the high attrition rate of the U. S. Marine Corps aviation candidates in the Naval Air Training Command, a new program of testing, of strict adherence to physical examination, and of careful screening prior to assignment to flight training was initiated. Candidates were also given the opportunity to actually fly in a T-34 training aircraft to see their first-hand reactions to flying. This program will lower the attrition rate, and save both the individual and the government time and expensive training costs.

7668

Woodworth, D. G.,
F. Barron, and D. W. MacKinnon
AN ANALYSIS OF LIFE HISTORY INTERVIEWER'S RATINGS FOR 100 AIR FORCE CAPTAINS.—[Univ. of California, Berkeley, Inst. of Personality Assessment and Research] (Contract no. AF 18(600)-8); issued by Air Force Personnel and Training Research Center, Lackland Air Force Base, Tex. (Project no. 7730, Task no. 77353) Report no. AFPTRC-TN-57-129, Nov. 1957. vi+26 p. AD 146 401 PB 135 535

Life-history interviews were conducted with each of 100 Air Force captains, and a set of ratings was derived from these intensive interviews. Ten of the interview ratings were presumed to be of fundamental psychiatric significance and were designed to represent predetermined areas of personal development and adjustment. A centroid factor analysis was made of the intercorrelations among the 10 variables and the resultant factors were related to variables derived from the non-interview phases of the assessment program. It was concluded that personal interview ratings show promise of contributing to the over-all evaluation of Air Force officer personnel. (Authors' abstract)

7669

Woodworth, D. G.,
and D. W. MacKinnon
THE MEASUREMENT OF INTELLECTUAL EFFICIENCY IN AN ASSESSMENT OF 100 AIR FORCE CAPTAINS.—[Univ. of California, Berkeley, Inst. of Personality Assessment and Research] (Contract no. AF 18(600)-8); issued by Air Force Personnel and Training Research Center, Lackland Air Force Base, Tex. (Project no. 7730, Task no. 77353). Report no. AFPTRC-TN-57-128, Nov. 1957. vi+50 p. AD 134 260 PB 135 627

An extensive psychological assessment of a group of 100 Air Force captains was made in order to develop a set of procedures which would identify those officers who were most effective in their jobs. Seventeen measures of intellectual functioning were subjected to a factor analysis. Four major factors emerged: functionally effective general intelligence, visual form-problem solving ability, effectiveness and originality in complex problem solution, and over-all general effectiveness. When the derived

factor scores were correlated with 11 operational and research criteria which were assumed to measure general officer effectiveness, it was found that the criteria of officer effectiveness were not predictable from the derived factor scores. Extreme caution should be exercised when using certain standard Air Force tools (e.g., Officer Effectiveness Reports) in evaluating the intellectual efficiency of officers because they may not be valid for this purpose. (Authors' abstract, modified)

7670

Worchel, P.

ADAPTABILITY SCREENING OF FLYING PERSONNEL: DEVELOPMENT OF A SELF-CONCEPT INVENTORY FOR PREDICTING MALADJUSTMENT.—Univ. of Texas, Austin; issued by School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 56-62, March 1957. 17 p. AD 140 470 PB 130 050

A self-rating scale for adaptability screening of flying personnel was developed on the basis of adjustment hypotheses involving self-rating, self minus ideal discrepancy and self minus other discrepancy (self depreciation). The inventory was used in three experiments designed to test the hypotheses expressed by the self-rating and discrepancy scores. The self-rating score discriminated significantly and consistently the anxiety-related criteria in all three experiments. The discrepancy scores produced equivocal results. (Author's abstract)

7671

Wrigley, C.,

C. N. Cherry, M. C. Lee, and L. L. McQuitty
USE OF THE SQUARE-ROOT METHOD TO IDENTIFY FACTORS IN THE JOB PERFORMANCE OF AIRCRAFT MECHANICS.—Psychol. Monographs, 71 (1): 1-28. 1957. DLC (BF1.P8, v. 71)

Descriptive items were selected from rating scales and questionnaires found in an extensive search of the psychological literature dealing with various aspects of job proficiency. A revised scale of 200 items was constructed and administered to 464 supervisors of Air Force mechanics. The supervisors were required to describe a best, poorest, or average mechanic by true-false responses to the items. Correlations between item responses were analyzed by a square-root factor method devised for use with correlation matrices too large for analysis with standard procedures. The ten leading factors extracted were general job efficiency, social maladjustment, executive ability, leadership, personal charm, resourcefulness, willingness and adaptability, orderliness, ability to motivate others, and mechanical proficiency. Calculation of phi coefficients between the items and the best-poorest classification revealed that "best" mechanics were described as cooperative, willing, responsible, flexible, accurate, and foresightful, while "poorest" mechanics were portrayed as lazy, careless, uncooperative, untrustworthy, and inefficient. Comparison of these results with those obtained by similar scales derived from relatively unstructured descriptions of best and poorest mechanics, or from factor-analytic studies, revealed agreement in the importance of practical capabilities rather than intellectual ability, and motivation and a sense of responsibility rather than socio-emotional adjustment.

7672

Zeidner, J.,

and L. G. Goldstein

EVALUATION OF FIXED-WING SELECTION TESTS FOR PREDICTING SUCCESS IN ARMY HELICOPTER PILOT TRAINING [Abstract].—Amer. Psychologist, 12 (7): 444. July 1957. DLC (BF1.A55, v. 12)

Abstract of item no. 6211, vol. V.

c. Training

[Flight simulators under 11-d]

7673

ALL THROUGH JET TRAINER.—Aircraft (Toronto), 19 (9): 47, 76, 78. Sept. 1957.

DLC (TL501.A56143, v. 19)

The North American Aviation new T2J-1 two-place jet trainer (designed as a complete pilot training system capable of taking students from primary through advanced phases, including Navy carrier indoctrination) is described as to its fundamental structural design as well as its capabilities for maintenance, range, take off, and landing.

7674

Bair, J. T.,

R. K. Ambler, and J. F. Snyder

A STUDY OF VOLUNTARY ATTRITION IN THE NAVAL AIR ADVANCED TRAINING COMMAND.—Naval School of Aviation Medicine, Pensacola, Fla. Special Report no. 57-5 (Attrition Report no. 23), Feb. 20, 1957. ii+6 p. AD 134 333

UNCLASSIFIED

Although the group of flight students who withdrew voluntarily after the first stage of advanced training was small, certain significant factors were observed: (1) they did not differ significantly from successful cadets on aptitude tests or in their basic flight training performance; (2) however, they did differ significantly on certain personality and vocational preference test scores. It would seem, therefore, that any screening of voluntary attritions during the first stage of advanced flight training should be based mainly on interest and personality factors rather than on aptitude or performance variables. (Authors' conclusions, modified)

7675

Bair, J. T.

A SURVEY OF THE U.S. NAVAL ACADEMY-AIR INDOCTRINATION COURSE, 1957.—Naval School of Aviation Medicine, Pensacola, Fla. Special Report no. 57-28, Nov. 15, 1957. ii+10 p. AD 151 652

UNCLASSIFIED

The results of this survey of the U.S. Naval Academy midshipmen (class of 1959) indicate a clear superiority of the U.S. Naval Academy-Air Indoctrination Course, 1957, offered at Pensacola, Florida, over any other type of air indoctrination in terms of subsequent knowledge of naval aviation and increased motivation toward naval aviation. (From the author's summary)

7676

Brown, William F.,

and D. K. Trites

ADAPTABILITY SCREENING OF FLYING PERSONNEL: EARLY FLIGHT BEHAVIOR AS AN INDEX OF

SUBSEQUENT ADAPTABILITY TO FLYING TRAINING.—School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 57-114, Aug. 1957. 21 p. AD 149 703 PB 132 772

To devise an early criterion of adaptability to primary pilot training, instructors' comments on the daily grade slips for the first ten instructional flights in the PA-18 light plane were analyzed. It was found that the scoring system developed for classifying comments could be used with a satisfactory degree of reliability and that training failures could be discriminated from training graduates with a high degree of accuracy, but that training failures for different reasons (ability, emotional, motivational) could not be satisfactorily differentiated. It was concluded that the present scoring system could not be used as an adaptability criterion but was an excellent predictor of pass-fail in training. (Authors' abstract)

7677

Bulban, E. J.

T2J DESIGNED AS PRIMARY-THROUGH-ADVANCED TRAINER.—Aviation Week, 66 (19): 52-53, 55-56, 59. May 13, 1957. DLC (TL501.A8, v. 66)

A detailed description is presented of North American Aviation's new T2J-1 two-place jet trainer. This trainer is designed as a complete pilot training system capable of taking students from primary through advanced phases, including Navy carrier indoctrination. Versatility of the airplane is such that it could shave at least a month from current student programs, which involve switching to several types in the course of normal curricula. Design concept, use of items available in large quantity in the Navy's inventory, and operational capability of the airplane are discussed.

7678

CANADAIR STRESSES VERSATILITY IN TRAINER.—Aviation Week, 67 (21): 81-82. Nov. 25, 1957. DLC (TL501.A8, v. 67)

Two prototypes of Canadair's new side-by-side seating CL-41 jet trainer are scheduled for completion in the fall of 1958. Initially designed to fill primary through basic flight-training missions, the jet trainer is also planned to include capability for ground support and use as a transport vehicle. A fuel load of approximately 2,000 lb. will be provided, giving the airplane a two-hour flight training cycle at sea level without refueling. The cockpit is planned to incorporate modern combat type equipment, including ejection seats, jettisonable canopy sequenced into the seat ejection system, cabin pressurization, two complete instrument panels, and a birdproof windshield.

7679

CANADAIR'S JET TRAINER.—Aircraft (Toronto), 19 (12): 23-24, 86. Dec. 1957. DLC (TL501.A56143, v. 19)

Descriptions are presented of the Canadian CL-41 basic jet training aircraft now in production and reputed to incorporate all desirable features necessary to take the student from the beginning through the basic flight training stages. Some of the features of this aircraft are: side-by-side seating for the instructor and trainee, ejection-type escape seats, a jettisonable canopy sequenced into the ejection escape system, cabin pressurization, complete instrumentation (including two blind-flying panels), and a bird-proof glass windshield.

7680

[Childerhose, R. J.]

FINISHING SCHOOL FOR FIGHTERS.—Aircraft (Toronto), 19 (11): 66, 69, 116, 118. Nov. 1957. DLC (TL501.A56143, v. 19)

The 18-week fighter pilot training course given by the finishing school of the Fighter Operational Training Unit, Chatham, N. B., is described which includes a week of ground school (primarily study of the Sabre jet aircraft), tactics (formation flying gradually working into battle formation), and gunnery (back-ground on weapons and learning to fly gunnery patterns). Good airmanship, common sense, and flying ability are the looked-for qualities among trainees; the finer points of the game can be picked up later in squadrons overseas where each of the graduates will go. The finishing school exerts a profound influence on the day-fighter squadrons, not only by sending out pilots well-versed in fundamentals, but by the fact that it is an assembly point for ideas from the Air Division itself in that its instructors are drawn from these different squadrons.

7681

Christal, R. E.,

and J. D. Krumboltz

PREDICTION OF FIRST SEMESTER CRITERIA AT THE AIR FORCE ACADEMY.—Air Force Personnel and Training Research Center, Lackland Air Force Base, Tex. (Project no. 7719, Task no. 17009). Report no. AFPTRC-TN-57-17, Jan. 1957. v+5 p. AD 98 920 PB 126 622

The intercorrelations of predictors and first-semester criteria at the Air Force Academy are presented for both the physically qualified applicant group and the selected cadets who completed the first semester. The following conclusions seem warranted: (1) the prediction instruments are highly successful in predicting first-semester course grades at the Academy, and (2) the reported validities should be considered conservative estimates of the "true" validities, since the correlations are based on the restricted range of talent found in the selected cadets instead of the broader range of talent found in the applicant group. (Authors' summary and conclusions)

7682

Christian, G. L.

COMPLEX AIRCRAFT DEMAND SIMULATORS.—Aviation Week, 66 (7): 96-101. Feb. 18, 1957. DLC (TL501.A8, v. 66)

The following three major trends created by the increase in complexity of aircraft systems in the field of training requirements for air crew and ground crew alike are outlined: (1) training aids (mobile panels or complex electronic flight simulators), (2) intermediate flight crew training devices such as procedure trainers—more sophisticated and realistic than simple panels, but less costly and complex than full-fledged simulators, and (3) training courses for ground crews (trouble shooters and line mechanics). These and other trends were brought out at the Second Training Symposium held in Cincinnati, Ohio, recently by Burton Rodgers-Technical Training Aids, Inc. Various examples are described and discussed as to their complexity, cost, and utility.

7683

Christian, G. L.

USAF PROGRAM WELDS MEN, HARDWARE.—Avia-

tion Week, 67 (3): 79, 81, 83, 85, 87, 90. July 22, 1957. DLC (TL501.A8, v. 67)

The function and utility are described of the new Air Force Qualitative Personnel Requirements Information (QPRI) program which considers human factors throughout the development of weapon systems. QPRI facilitates greater effectiveness of each new weapon system because: (1) new positions are identified early in the development cycle; (2) personnel and training needs are considered well in advance; (3) training parallels hardware development; and (4) adequately trained personnel are available when and where needed. Weapon system airframe manufacturers endorse QPRI.

7684

Craig, R. C.

AN EXPERIMENTAL STUDY OF RECOMMENDATIONS FOR THE IMPROVEMENT OF AIRCREW EMERGENCY CAPABILITY [Abstract].—Amer. Psychologist, 12 (7): 470. July 1957.

DLC (BF1.A55, v. 12)

Two types of training developed by an original technique from technical and empirical data on performance during emergencies in B-47 aircraft were tested on experienced aircrews. Practice with slide sequences picturing developing emergencies was found to improve ability to detect and identify emergencies in a flight simulator. Isolation and correction of emergencies were improved by practice in decisions and response sequences with materials resembling "tab" tests.

7685

de Rivera, J.

THE PREDICTION OF ANXIETY IN AVIATION STUDENTS.—Naval School of Aviation Medicine, Pensacola, Fla. (Project no. NM 16 01 11, Subtask 11). Report no. 1, March 15, 1957. ii+24 p.

UNCLASSIFIED

The anxiety of 59 flight students is described. The students are divided into two groups; one group of 19 men demonstrated above-average anxiety in flight training; the other group of 40 men were not overly anxious. Tests given before the men flew, which distinguish between these two groups, are described. A multiple correlation predicting anxiety is derived. The effect of anxiety on learning to fly is discussed, and a way of reducing anxiety is suggested. (Author's abstract)

7686

de Rivera, J. H.

A NOTE ON THE REFINEMENT OF THE PRE-FLIGHT NAVIGATION GRADE WHEN USED AS A PREDICTOR OF FLIGHT FAILURE.—U. S. Naval School of Aviation Medicine, Pensacola, Fla. (Research Project no. NM 14 02 11, Subtask 1). Report no. 24, Sept. 2, 1957. 3 p. AD 154 611

UNCLASSIFIED

The means, standard deviations, and biserial correlations of the navigation grade of students who failed at the Naval School of Pre-Flight in 1955 are tabulated. The navigation grade is based on four equally weighted subgrades: DR (deadreckoning) weekly quiz grades, the DR final examination, CEL (celestial) weekly quiz grades, and the CEL final examination. The results indicated that the DR navigation grade is superior in predictive ability to the celestial navigation grade. This DR navigation grade is equal in efficiency or superior in efficiency to the combined grades obtained in navigation.

7687

Ely, J. H.,

R. Schneider, C. R. Kelley, and R. C. Channell
TRACKING TRAINING I: AN APPROACH.—Dunlap and Associates, Stamford, Conn. (Contract Nonr-1908(00)); issued by Naval Training Device Center, Port Washington, New York (NAVTRADEVEN Project no. 20-F-12). Technical Report no. NAV-TRADEVEN no. 1908-00-1, May 29, 1957. vii+69 p. AD 143 781

UNCLASSIFIED

A program was initiated to elicit the trainable aspects of tracking performance critical to operational success and to indicate the functional characteristics of training devices required to provide successful training. A survey of tasks containing tracking elements was conducted through literature surveys and visits to field operational and training activities. A descriptive model of tracking behavior designed to encompass all tracking tasks was developed. A group of hypotheses was formulated concerned with transfer of training in tracking tasks. (AD abstract)

7688

EVALUATION SHOWS T-37A IS FAST, SIMPLE, COMPACT.—Aviation Week, 66 (13): 48-49, 51, 53, 55, 57, 60. April 1, 1957.

DLC (TL601.A8, v. 66)

Evaluations are described of Cessna's new twin-jet side-by-side T-37A primary trainer designed to become a vital link in the United States Air Force all-jet crew training program. The trainer is fast, compact, and easy to handle. Its side-by-side feature is favored by the USAF because it facilitates the student's indoctrination with jet techniques and procedures and the instructor can observe the student at all times. Communications equipment, however, is unsatisfactory.

7689

Johnsen, K.

NAVY TAKES FIRM STAND ON BAN AGAINST CONTRACT PILOT TRAINING.—Aviation Week, 67 (13): 34. Sept. 30, 1957. DLC (TL501.A8, v. 67)

The Navy's firm stand is described against contract school training of its pilots as proposed by a study by Robert Heller and Associates, Cleveland, Ohio, and urged by the Aeronautical Training Society. The Heller study states that the Navy's adoption of contract school training would result in expense reduction, as good, and possibly better quality of flight training, and increase in over-all military strength by fleet assignment of the Navy personnel engaged in primary training duty. The Navy is confident that its decision against contract training for its pilots will not be overridden for these two reasons: (1) the Navy's new plan to compress primary training will make savings far in excess of those contemplated in the Heller report, and (2) there would be too much congressional pressure against closing a major complex of the Pensacola base.

7690

Kingwill, A. N.

ALL-THROUGH JET TRAINING.—Interavia (Geneva), 12 (9): 883-884. Sept. 1957.

DLC (TL500.I555, v. 12)

Two main lines of the development of jet training are reviewed and compared. One involves the conversion of piston-engine trained pilots by the use of intermediate jet trainers on which both the second stage of training and a portion of the third (or ad-

vanced) stage are carried out. In the other the ab initio jet trainer is used ensuring that all training is jet with capability of taking over a portion of the advanced jet syllabus, if only on the score that no jet conversion is necessary. The following are obtained where a satisfactory ab initio jet trainer is provided and the entire training is jet power: (1) the training is two-stage and therefore more economical; (2) there is no possible confusion in the pupil's mind since techniques remain unchanged throughout training; and (3) because there is no jet conversion at any stage, very high standards are achieved in a shorter time. The satisfactory employment of the two-stage all-through jet training scheme by the Royal Air Force is described.

7691

Kramboltz, J. D.,

and R. E. Christal

PREDICTIVE VALIDITIES FOR FIRST-YEAR CRITERIA AT THE AIR FORCE ACADEMY.—Air Force Personnel and Training Research Center, Lackland Air Force Base, Tex. (Project no. 7719, Task no. 17009). Development Report no. AFPTRC-TN-57-95, July 1957. v+6 p. AD 134 218 UNCLASSIFIED

The correlations of predictors with criteria as well as the intercorrelations among criteria are presented for 239 cadets in the class of 1959 who completed their first full year of training at the Air Force Academy. The general magnitude of the validities is quite high especially in view of the fact that considerable restriction in range has occurred due to selection and attrition. However, some of the criteria (e.g., the Aptitude for Commissioned Service Rating and grades in Philosophy) are not predicted as well as might be desired. (Authors' summary)

7692

Lackay, R. H.

TRAINING FOR THE PRACTICE OF AVIATION MEDICINE. — Jour. Amer. Med. Assoc., 164 (13): 1425-1431. July 27, 1957. DLC (R15.A48, v. 164)

Aviation medicine is recognized as a full-time specialized practice resulting from a combination of elements of several of the other basic medical specialties, such as ophthalmology, otolaryngology, psychiatry, internal medicine, and preventive medicine. To become a true specialist in aviation medicine one must undergo several years of graduate training. The U. S. Air Force Aviation Medicine Specialty Training Program is described. (Author's abstract, modified)

7693

Lodi, A.

[NON-FLYING SPECIALISTS OF THE FRENCH MILITARY AIR FORCE] Gli specialisti non di volo della aeronautica militare francese.—Rivista aeronautica (Roma), 33 (5): 601-609. May 1957. In Italian. DLC (TL504.R54, v. 33)

Apprentice maintenance personnel are recruited at 16 years of age, volunteers at 18 years of age, and are trained following psychological selection based on aptitude tests. Training consists of a 2-year scholastic course after which time students are oriented towards the aviation specialty. Consideration is given to the scholastic organization and training systems of the French School of Aviation as applied to specialists.

7694

Martocchia, C. T.,

and H. P. Kelley

SOME DIFFERENCES AMONG NAVAL AVIATION CADETS WHO ATTRITED DURING PRE-SOLO STAGE, LATER BASIC AIR FLIGHT TRAINING, AND ADVANCED AIR FLIGHT TRAINING.—Naval School of Aviation Medicine, Pensacola, Fla. (Project no. NM 14 02 11, Subtask 1). Report no. 20, Feb. 1, 1957. ii+10 p. UNCLASSIFIED

Naval aviation cadets attriting from training at three different stages were compared in terms of selection test scores, background variables, and pre-flight grades. It was found that the later in training the attrition occurred, the higher were the mean scores on the Flight Aptitude Rating and its components; however, the highest mean pre-flight grades appeared in the middle attrition group. These results suggest that the demands on aptitudes related to scholastic success are stronger in advanced training than in basic training, and that pre-flight grades might be useful in predicting attrition in advanced training. (Authors' abstract)

7695

Mitchell, R. E.

ATTRITION IN THE NAVAL AVIATION BASIC TRAINING PROGRAM DUE TO PHYSICAL DISQUALIFICATION.—Naval School of Aviation Medicine, Pensacola, Fla. Special Report no. 57-2, Jan. 14, 1957. ii+6 p. AD 134 331 UNCLASSIFIED

A high attrition rate because of physical disqualifications was noted in the Naval Air Basic Training Command during the fiscal year 1956. The disqualifications observed were analyzed, and in each instance an evaluation made as to whether the disqualifying defect should have been detected prior to entry of the student into the flight training program. In over half of the instances attrition was due to defects which were detectable prior to the time the individual reported for training. Reevaluation of the medical examination program at the procurement centers is advised. (Author's summary)

7696

O'Donnell, W.

AIR FORCE LAUNCHES JET TRAINING WITH T-37A.—Amer. Aviation, 21 (6): 69. Aug. 12, 1957. DLC (TL501.A675, v. 21)

The beginning of primary jet training for US Air Force student pilots is described. Twenty students were introduced to the Cessna T-37A in primary training at Bainbridge Air Base, Ga. The move to the T-37 is part of the project of suitability testing of the jet trainer for the mission for which it was designed. Other student pilots will begin regular training in the jet beginning in January. Training in the T-37 includes 80 hours of contact proficiency flying, 20 of navigation, 15 of aerobatics, and 35 of instrument flying. Academic training includes 20 hours of principles of flight, 36 of physiological training, 50 of navigation, 15 of flight instruments, 15 of flight planning, 27 of weather, 15 of aural and visual code, and 3 of flying safety. If the evaluation proves successful, the T-37 will become the Air Force's standard primary trainer.

7697

Parker, J. F.,

H. E. Price, J. T. McLaughlin, W. P. Shanahan, and H. Older

AVIATION MEDICAL SAFETY TRAINING: COURSE

CONTENT MATERIALS FOR TRAINING NAVAL FLIGHT SURGEONS.—Psychological Research Associates, Arlington, Va. (Contract N61339-28); issued by Naval Training Device Center, Port Washington, N. Y. (NAVTRADEVCEEN Project no. 20-B-1). Technical Report NAVTRADEVCEEN no. 1339-28-3, Aug. 31, 1957. viii+319 p. AD 150 818 UNCLASSIFIED

This report is the result of a comprehensive study of the role of the flight surgeon in aviation medical safety activities. It will be followed by 3 volumes dealing with areas in need of training not now provided, the substantive content of aviation medical training for flight surgeons, and training aid and device requirements. The following chapters are listed in the table of contents: (1) role of the flight surgeon in aviation safety, (2) accident investigation procedures, (3) the accident prevention program, (4) physiological factors, (5) psychological factors, and (6) physical factors. Also included are appendixes and illustrations.

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Parker, J. F.,

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AVIATION MEDICAL SAFETY TRAINING: PROCEDURES, FINDINGS AND RECOMMENDATIONS.—Psychological Research Associates, Arlington, Va. (Contract no. N61339-28); issued by Naval Training Device Center, Port Washington, N. Y. (NAVTRADEVCEEN Project 20-B-1). Technical Report NAVTRADEVCEEN no. 1339-28-1, Aug. 31, 1957. 41 p. AD 149 500 UNCLASSIFIED

The purpose of this volume (vol. 1 of 3 volumes) is to survey all information available from diverse sources relating to the human factors aspects of aircraft accidents. From these materials information is abstracted to provide the knowledge, methods, and techniques whereby the flight surgeon can increase his capability to perform his two primary functions in flight safety: the investigation of aircraft accidents, and the training of pilots in accident prevention procedures.

7699

Parker, J. F.,

H. E. Price, J. T. McLaughlin, W. P. Shanahan, and H. Older

AVIATION MEDICAL SAFETY TRAINING: RECOMMENDED TRAINING AIDS AND DEVICES.—Psychological Research Associates, Arlington, Va. (Contract no. N61339-28); issued by Naval Training Device Center, Port Washington, N. Y. (NAVTRADEVCEEN Project no. 20-B-1). Technical Report no. 1339-28-3, Aug. 31, 1957. iii+38 p. AD 150 185 UNCLASSIFIED

This is volume III of a three volume report concerning various aspects of the naval flight surgeon's role in aviation safety. In defining the substantive content of materials required to instruct flight surgeons in accident investigation and prevention procedures, areas are noted in which the training program may be facilitated through the use of appropriate training aids and devices. In each instance the teaching need is defined and a description provided. Recommended training aids include an accident investigator's kit; illustrations of aircraft crash site, cockpit area after crash, and human engineering design principles; mobile personal equipment trainer; survival equipment; flight and/or protective clothing; oxygen requirements for breathing, etc.

7700

Philmus, L. C.

CONTRACT FLIGHT SCHOOLS MAY WIN LONG FIGHT WITH NAVY.—Amer. Aviation, 21 (10): 71-72, Oct. 7, 1957. DLC (TL501.A675, v. 21)

Various arguments are discussed as presented by the Aeronautical Training Society (ATS) and the U. S. Navy regarding the Navy's use of contract primary training. The ATS's position is that the Navy should use the contract method, and it is based on the Heller Report which suggests that this method would provide more efficient and economical primary flight training. The Navy takes the opposite position, principally because use of the contract method would force it to overhaul its entire training philosophy; the Navy's primary curriculum and its decreasing pilot input make contracting impractical. It is suggested that the Navy might lose its fight. The Air Force and the Army are strong for the contract method, with the Navy the lone holdout.

7701

Puni, A. C.

[THE EFFECT OF IMAGINARY MOVEMENT ON TRAINING] O treninovém působení pohybových představ.—Teorie a praxe tělesné výchovy a sportu (Praha), 5 (2): 90-97, 1957. In Czech. DLC (GV201.T38, v. 5)

This is a review of the literature on the effect of imagined movement on the acquisition of motor habits. Several experiments are cited in evidence of the beneficial effect of ideomotor images in the process of learning a motor skill. Some support is also offered by measurements of muscle tension in limbs involved in the projected image of the movement. Mere visual presentation of the motor skill does not have the same effect since only the oculomotor muscles are involved.

7702

RAF FINDS PILOTS CAN LEARN TO FLY JETS WITHOUT PREVIOUS PISTON TRAINING.—Amer. Aviation, 21 (9): 66, Sept. 23, 1957. DLC (TL501.A675, v. 21)

Jet training from the beginning is not only feasible but in most ways preferable to beginning with piston trainers and later on converting to jets. This information is reported by Group Captain R. J. Abrahams, commandant of No. 2 Flying Training School of the Royal Air Force and based on results of RAF operation on eight Jet Provost Mark 1 trainers since September 1956, and on the Mark 2 for the last four months of the courses. There were only minor accidents during the period, with no injuries to instructors and pupils. All-jet training results in easier instruction and quicker learning up to the solo stage because of the absence of swing and training in a smoother, quieter airplane. After solo the pupil has to be watched for altitude, as he can easily fly too high before knowing the snags and techniques. The present trainers are described as well as projections of the features of the Jet Provost Mark 3.

7703

RED AIR FORCE TRAINING SCHOOLS ACCUSED OF INSTRUCTION DEFICIENCIES.—Aviation Week, 66 (6): 75-76, Feb. 11, 1957. DLC (TL501.A8, v. 66)

Instruction deficiencies in Russian air force training institutes are presented as suggested by Red Star, the official organ of the USSR Ministry of Defense. It is stated that newly-commissioned flight officers are

knowledgeable in location and design of various aircraft and engine parts and components as well as in flight theory; however, they are deficient in actual flying ability, elementary aerodynamics, and operation of equipment in the air and on the ground. It is suggested that students get more training in winter months, especially under difficult weather, and that commanders stop being needlessly over-cautious and excessively protective of their students.

7704

Rogers, O. E.,
and Marshall B. Jones
A NEW ADVANCED TRAINING PROGRESS GRADE.
—Naval School of Aviation Medicine, Pensacola, Fla.
Special Report no. 57-8, March 1, 1957. ii+3 p. AD
134 336 UNCLASSIFIED

The calculation of an effective grade predictive of performance in advanced flight training is presented. An effective grade was derived from the basic flight grade, basic ground grade, and the flight aptitude rating of the selection battery.

7705

Rowen, B.
THE JOB OF FLYING HIGH PERFORMANCE AIR-
CRAFT.—In: Symposium: physical standards and
selection, p. 146-149. Randolph Air Force Base,
Tex.: Air University, 1957. AD 144 144
UNCLASSIFIED

The job of flying high-performance fighters or bombers is relatively simplified, providing the trainee received the proper specialized training. The Air Force is attempting to facilitate this by purchasing a limited number of two-place combat aircraft in the current series of Century fighters. The crewman and aircraft will continue to fly as a team through the development of super-high performance flight. Man definitely is part of the rocket picture and it is anticipated that with proper ground monitoring he will continue as the missiles' monitor in the research field. (Author's summary)

7706

Roy, S.
SOME PERSONAL FACTORS IN FLYING TRAINING.
—Aero Med. Soc. Jour. (New Delhi), 4 (1): 19-23.
Dec. 1957. DNLM

During flight training, pupils are confronted with such problems as facing the selection board, fear of suspension, fear of the instructor, fear of the air, cockpit discomfort, and cumbersome flying clothing. Instructors, on the other hand, are faced with a tendency to shout instructions, give bad demonstrations, show tension while pupils are at the controls, and to lack confidence in their own ability to teach.

7707

Schwartz, M.
AN EVALUATION OF THE EFFECTIVENESS OF THE
READING TRAINING IN THE U.S. NAVAL SCHOOL,
PRE-FLIGHT.—Naval School of Aviation Medicine,
Pensacola, Fla. (Project no. NM 14 02 11, Subtask 12).
Report no. 1, March 1, 1957. ii+8 p. UNCLASSIFIED

The effectiveness of the reading training given beginning naval aviation students as part of the pre-flight curriculum was evaluated. It was found that the reading training results in increased speed of reading for nontechnical material which transfers positively to the reading of technical material. However, accompanying this increased speed of reading is a small but statistically reliable loss in the compre-

hension of the material read. Recommendations for increasing the efficiency of the program (including measures for reducing comprehension loss) are presented.

7708

SHEARWATER: THE ROYAL CANADIAN NAVY'S
UNIQUE LAND BASE WHERE SEAMEN ARE
TRAINED FOR AIR OPERATIONS.—Aircraft
(London), 19 (8): 12-14, 80-81. Aug. 1957.
DLC (TL501.A56143, v. 19)

The operations and training activities of several squadrons carried on at the Royal Canadian air station at Shearwater are described. The squadrons include the HU-21, which provides search and rescue services, trains naval helicopter pilots, is responsible for all fleet helicopter requirements, and supplies army support; the Helicopter Anti-Submarine HS-50, which specializes in patrol; the VF870 Banshee—jet—which trains for its future all-weather duties. These operations and training activities on land prepare pilots, deck crews, and maintenance people for the Navy's air role in time of war.

7709

Stone, I.
SABRELINER FITS USAF SHELF ITEM CONCEPT.—
Aviation Week, 67 (23): 53, 55-56, 59, 63, 65. Dec. 9,
1957. DLC (TL501.A8, v. 67)

North American Aviation's twinjet utility trainer is described as projected to meet Air Force requirements and a scheduled rollout date of May 15, 1958. The Sabreliner has a basic capability of hauling four passengers and a crew of two. Its training and general capabilities are projected to include jet procedures and techniques, single-engine procedures, jet transition training, night and instrument flying, navigational training, radar-observer and electronic-countermeasure training, target-towing and chase, ground-control intercept training, logistics support of combat aircraft, and air rescue work. Detailed descriptions are also presented of the trainer's cockpit, seating arrangement, interior arrangements, safety measures, wing features, structural details, and cockpit instruments.

7710

TRAINING PILOTS FOR THE RCN: RCN TURNS TO
U.S. NAVY SCHOOLS TO MEET PILOT TRAINING
NEEDS.—Aircraft (Toronto), 19 (11): 81-82, 85.
Nov. 1957. DLC (TL501.A56143, v. 19)

Training of Royal Canadian Navy (RCN) pilots including both the early stages in Canada and final and more specialized ones in U.S. Navy schools is described. The latter is necessary because the RCN requirement of only 40 new pilots a year makes a Canadian training program infeasible and training during an earlier period by the Royal Canadian Air Force has proved unsatisfactory. The final graduate assignment is to one of the two RCN flying duties: in either anti-submarine or fighter squadrons. The main avenues of entry including the Regular Officer Training Plan which is common to all three services and the "Venture Plan" through which most naval aircrew officers now enter, are also described.

7711

Trites, D. K.,
A. L. Kubala, and B. B. Cobb
CRITERION DIMENSIONS OF ADAPTABILITY TO
PILOT TRAINING [Abstract].—Amer. Psychologist,
12 (7): 444. July 1957. DLC (FB1.A55, v. 12)

Five factors, tentatively thought to represent peer acceptance, age-related similarity, academic achievement, and military conformity, were abstracted from 22 variables characterizing various attributes of pilot trainees. Several of the factors were differentially related to training success or failure associated with emotional, motivational, or ability factors. (Quoted in part)

7712

Voas, R. B.

INVENTORY TESTING OF VOCATIONAL INTERESTS OF NAVAL AVIATION CADETS: FINAL RESULTS.—Naval School of Aviation Medicine, Pensacola, Fla. (Project no. NM 14 02 11, Subtask 1). Report no. 23, April 15, 1957. ii+8 p. AD 144 096 UNCLASSIFIED

The Kuder Preference Records of 605 naval aviation cadets were used to examine measured interest patterns as predictors of success, failure or voluntary withdrawal. Small but statistically significant validity was demonstrated for the prediction of all types of attrition from Kuder Preference Records. However, when differences in mechanical ability were controlled, this inventory did not show a significant relationship to the pass-fail criterion. Thus, the vocational interests measured by this scale do not appear to have any relationship to success in flight training except as they reflect the presence or absence of the special skills required in flying. (Author's abstract)

7713

Voas, R. B.

VALIDITY OF PERSONALITY SCALES FOR THE PREDICTION OF SUCCESS IN NAVAL AVIATION TRAINING [Abstract].—Amer. Psychologist, 12 (7): 465. July 1957. DLC (BF1A55, v. 12)

The Minnesota Multiphasic Inventory and the Guilford-Zimmerman Temperament Survey were administered to Naval cadets entering flight training. Both inventories yielded significant validities for all types of attrition during the first 16 weeks of training, but not for later training. Attrition was associated with "maladjustment" and "anxiety" scores.

7714

Ward, J. E.

PHYSICAL STANDARDS FOR HIGH-ALTITUDE INDOCTRINATION.—In: Symposium: physical standards and selection, p. 150-153. Randolph Air Force Base, Tex.: Air University, 1957. AD 144 144 UNCLASSIFIED

There appears to be a need specifically to require anyone, passengers or crew members, participating in today's type of military jet flight to pass a minimum of a physical examination approaching the Class-III flying physical. Experience to date has not indicated a need for specific and separate physical standards per se for partial-pressure suit training. The partial-pressure suit training program is not static and will continue in a state of flux as long as strategic requirements for high-altitude flight are changing. Furthermore, constant modification and improvement in suit design has quantitatively changed the actual physical stress imposed upon the wearers of these protective garments. (Author's summary)

7715

Webb, W. B.

A FOLLOW-UP AND REVISION OF THE PRE-

FLIGHT PROGRESS GRADE.—Naval School of Aviation Medicine, Pensacola, Fla. Special Report no. 57-4, Feb. 21, 1957. ii+4 p. AD 134 332

UNCLASSIFIED

This study represents the second follow-up of the effectiveness of the pre-flight progress grade and makes recommendations for its modification. Data are tabulated which indicate that individuals with unsatisfactory progress grades (set at approximately the lower 7%) were attrited at nearly a 4:1 ratio for the officers-under-instruction and a 2:1 ratio for cadets and aviation officer candidates, as compared with individuals with satisfactory progress grades for the flight-failure category. A substantial relationship between the pre-flight progress grade and subsequent attrition is found.

7716

Willingham, W. W.

EXTERNAL FACTORS RELATED TO DOR ATTRITIONS: MONTH ATTRITED AND CHARACTERISTICS OF PRE-FLIGHT CLASS.—Naval School of Aviation Medicine, Pensacola, Fla. Special Report no. 57-6, Feb. 25, 1957. ii+6 p. AD 134 334 UNCLASSIFIED

Analysis of a sample of 690 Naval cadets who dropped on request (DOR) from pre-flight or basic training revealed a lower incidence in the winter months even though the highest single month was January. The month of attrition was related to Flight Aptitude rating and to the stage attrited. It was also found that different pre-flight classes had significantly different DOR rates, and these rates tended to lump at different points in the training. Classes with high DOR rates were not significantly different from classes with low rates on any of a number of aptitude and performance measures. The variation in DOR rates were most likely due to morale or a contagion effect. (Author's findings, modified)

7717

Willingham, W. W.

A NOTE ON THE PREDICTIVE VALIDITY OF PHYSICAL TRAINING PHASE GRADES.—Naval School of Aviation Medicine, Pensacola, Fla. (Project no. NM 14 02 11, Subtask 1). Report no. 22, May 6, 1957. ii+5 p. AD 144 095 UNCLASSIFIED

The physical fitness and survival grade in pre-flight is currently used as a predictor of future success in flight training. This grade is based on six phases of training which differ considerably in content. In this study these phase grades were related to subsequent performance in flight training in an attempt to improve the predictive validity of the pre-flight progress grade. Results indicate that (1) gymnastics grade predicts future flight success just about as well as overall physical training grade, and (2) no revised weighting system will improve the validity of the total grade. (Author's abstract)

d. Performance and Fitness

[Physical fitness tests under 8-f]

7718

Arbeit, S. R.,

E. Jokl, A. Koskela, and W. E. McCubbin
BALLISTOCARDIOGRAPHIC CHANGES DURING A 30 DAY PHYSICAL TRAINING PERIOD.—Amer. Heart Jour., 54 (4): 556-560. Oct. 1957.
DLC (RC681.A1A58, v. 54)

A healthy male subject, 40 years of age, was subjected to a 30-day physical conditioning course which included calisthenic exercises, apparatus gymnastics, weight lifting, and swimming. Marked improvement was noted in performance after this course. Ballistocardiograms taken before the experiment, after the first 10 days of the course, after 20 days, and at the end of the course showed progressive improvement in cardiac efficiency. Ballistocardiography should be a valuable instrument in determining degrees of physical fitness in healthy subjects.

7719

Aschan, G.

[REPORT OF AN INVESTIGATION OF THE HEARING EFFICIENCY OF FLYING PERSONNEL IN THE ROYAL SWEDISH AIR FORCE] Redogörelse för 1956 års hörselundersökning vid flygvapnet.—Meddelanden från flyg- och navalmedicinska nämnden (Stockholm), 6 (1): 1-18. 1957. In Swedish, with English summary (p. 16-18) DNLN (W1SW387, 1957)

The hearing of all flight personnel and a part of the ground personnel in the Swedish Royal Air Force was examined in 1956. The results were compared with the examinations of 1951 prior to conversion to jet aircraft. It was concluded that five years of jet-flying have not resulted in more severe pure-tone audiogram changes in pilots. On the basis of speech-audiometric findings it is justified to let the pilots go on flying despite changes in the pure-tone audiogram threshold as long as they can prove that their hearing is functionally good in speech-audiometric tests. The threshold losses are well compensated by the training to listen acquired in flight and as a part of their flight training. Many changes in the pure-tone audiograms are due to noise exposure other than the one generated by the aircraft engines. The value of noise prophylaxis must be stressed and applied not only to work on the airfield but also to shooting practices. (From the author's summary)

7720

Bogaert, E.

[PSYCHOLOGICAL CONTROL AND SUPERVISION OF FLYING PERSONNEL IN AVIATION] Contrôle et surveillance psychologique de personnel navigant dans l'aviation.—Travail humain (Paris), 22 (1-2): 53-66. Jan.-June 1957. In French, with English summary (p. 65-66).

DLC (T58.A2T7, v. 22)

Psychological control of flying personnel is of great value in preventing aircraft accidents, protecting the staff, and analyzing mental disorders arising in aviation. Supervision is limited to pilots who have committed errors in flying or show signs of fatigue or mental depression, and to newly selected pilot candidates. Psychological supervision is organized for research purposes and applies to few individual cases. It consists of a team of psychologists, psychiatrists, physiologists, and physicians who compare notes during an examination. The examiners try to evaluate the mental picture of each individual by means of basic physiological and psychological tests.

7721

Bouman, M. A.

SELECTION FOR COLOR NAMING OF AIR TRAFFIC LIGHTS AND READING OF RADIO RESISTANCES COLOR CODE.—In: The first European congress of aviation medicine, p. 53-58. Aeromedica acta (Soesterberg, Netherlands), Special edition, 1957. In English. DNLN

Test scores on pseudo-isochromatic plates (Ishihara, Hardy-Rand-Rittler, and Inter Society Color Council U. S. A. Color Aptitude Test) for normal and color-deficient subjects were compared with their ability to recognize signal lights (Edridge-Green, and Giles-Archer lanterns) and identify the components of a radio resistances color code. The results show that a fraction of subjects with a considerable number of mistakes on the Ishihara plates were still potentially good code-readers. HRR plates were found to be more selective in this respect.

7722

Carp, A.,

and R. Cassel

DEVELOPMENT AND PRELIMINARY ANALYSIS OF A NEW Q SORT TYPE OF LEADERSHIP TEST [Abstract].—Amer. Psychologist, 12 (7): 464. July 1957. DLC (BF1.A55, v. 12)

The Q Sort Test of Leadership was developed from critical incident and characteristic statements of good and poor leaders made by Air Force pre-flight personnel. Analyses were made of personal, social, and ideal self-arrays of 100 pre-flight cadets before leadership training, and of a personal array subsequent to training. Air Force norms developed from personal arrays of colonels at the Air War College were compared with responses from psychologists, chaplains, and federal reformatory prisoners. Significant differences were found among the self concepts, and a significant change was observed in the personal concept following training.

7723

Claro, J. J.

VISUAL STANDARDS: COLOR VISION.—In: Symposium: physical standards and selection, p. 61-65. Randolph Air Force Base, Tex.: Air University, 1957. AD 144 144 UNCLASSIFIED

Color-vision defects are traced historically together with their measuring techniques. Normal color vision has been considered a requirement for flying since the beginning of military aviation in the United States. In modern flying, particularly in military combat flying, many other factors have assumed much greater importance. Normal color vision can be eliminated as a criterion for flying ability by the use of appropriate measures involving selection and quality of colors used in aviation.

7724

Collins, T. A.

THE SIGNIFICANCE OF LOSS OF CONSCIOUSNESS.—In: Symposium: physical standards and selection, p. 123-127. Randolph Air Force Base, Tex.: Air University, 1957. AD 144 144 UNCLASSIFIED

The interpretation and management of disturbances of consciousness in the selection and maintenance of aircrews are discussed. The urgent need is to establish the diagnosis of tendency. The only safe procedure 35 years ago was to assume that one episode of loss of consciousness might signify a tendency, thereby justifying blanket exclusion. Today means have been developed to evaluate scientifically individual cases. Unless it is fully appreciated by all fliers or flying candidates that the medical profession now has the capability to discriminate between the safe and the unsafe—the repeater and the non-repeater—concealment, with the resultant undetermined cause of fatal accidents, will continue. To be effective, this capability must be coupled with the authority to make individual recommendations without restric-

tion of the current directives. Recommendations for improvements in this area are presented.

7725

Detambel, M. E.,
and L. M. Stolorow
**PROBABILITY AND WORK AS DETERMINERS OF
MULTICHOICE BEHAVIOR.**—*Jour. Exper.
Psychol.*, 53 (2): 73-81. Feb. 1957.

DLC (BF1.J6, v. 53)

Behavior patterns were studied in a task requiring the finding of a malfunction in one of three components by investigation of components in a sequence of the subjects' choice. Both probability of defect and amount of work required to find the defect in a given component were regulated so that the sequence of examination throughout a trial was either inconsequential or required initial examination of a low-work, low-probability component for maximum efficiency. In both tasks, subjects tended to make an initial examination of the component with high probability of defect. It is suggested that in many problem-solving tasks men do not discover efficient behavior sequences as a consequence of performing the task. It is concluded that the most efficient work sequence for such tasks should be mathematically estimated and designated as standard work procedure.

7726

Diamond, S.
ACQUIRED MYOPIA IN AIRLINE PILOTS.—*Jour.
Aviation Med.*, 28 (6): 559-568. Dec. 1957.

DLC (RC1050.A36, v. 28)

Two groups of pilots were studied, one group of 16 men with myopia developed after service and the second group of 51 men with continuous normal vision. In the myopes the average shift was -0.65 diopters during an average service of 12.3 years. It appeared that the longer the length of service the greater was the degree of myopia. The normal pilots had maintained normal vision for 9-18 years from the time of their employment at 20-30 years of age. Pre-employment aberrations in this group were mainly hyperopic and were greater in the early twenties with a decline thereafter. This indicated that emmetropia at this age is an unstabilized condition. A sufficient hyperopic reserve will offset the apparent myopic shift at this age and will enable the individual to remain with 20/20 vision over a long period of duty. Pilots selected from the long-term viewpoint, should have 20/20 vision with a hyperopic reserve of +0.05 diopters or more, especially those in the early twenties.

7727

Döbeln, W. von
**COLOUR PERCEPTION REQUIREMENTS IN AVIA-
TION: A CRITICAL STUDY.**—In: The first European
congress of aviation medicine, p. 49-52. *Aeromedica
acta* (Soesterberg, Netherlands), Special edition, 1957.
In English. DNLM

Formerly pilots had to interpret colored signals at airfields and in the air; therefore they had to have normal color perception. Now in commercial aviation take-off and landing instructions are given by radio, and the runways are illuminated by white lights. Moreover, with the modern high-speed aircraft, the height of the landing approach and the speed are greater, which results in pilots having to recognize airport lights at greater distances. White lights are perceived before colored lights. In view of these

facts, normal color perception is no longer essential for the commercial pilots. Elimination of this requirement would help in recruitment.

7728

DuPre, F. O.
MUSCLE MAINTENANCE.—*Air Force*, 40 (6): 104,
107-108. June 1957. DLC (UG633.A65, v.40)

Individual and group physical conditioning by means of sports and exercises is an important part of the U. S. Air Force physical fitness program, and not limited to those on flying status. Because of its long-range, mass B-47 and B-52 flights, the Strategic Air Command has added judo and hand-to-hand combat training. Emphasis is based on self defense; however, the net effect of physical conditioning is to leave the men remarkably alert, physically and mentally, and well able to endure the pressures and demands of prolonged flight.

7729

De Vries, E.
**EVALUATING THE OPTOKINETIC REFLEX IN CON-
NECTION WITH THE ROLE OF THE EYE AS AN
ORGAN OF EQUILIBRIUM.**—In: The first European
congress of aviation medicine, p. 177-180. *Aero-
medica acta* (Soesterberg, Netherlands), Special edi-
tion, 1957. In English. DNLM

Nystagmus caused by the optokinetic reflex was recorded electrographically with the electrodes attached to the temples. The potential difference between the right and the left temporal areas is roughly directly proportional to the horizontal turning angle of the eyeball. Evaluation of nystagmograms for 100 young men revealed an abnormal "crenelated" appearance of nystagmus in nine. Preliminary studies of pilot candidates and instructor evaluations indicated that individuals with the "crenelated" nystagmograms experience difficulties in learning to fly. Since the optokinetic nystagmus stimulates the equilibrium centers of the central nervous system in a similar manner as the vestibular stimulus, it is suggested that examination of the optokinetic nystagmus should form a part of the medical selection tests.

7730

Fokkema, S. D.
**SOME NOTES ON THE PSYCHOLOGICAL ANALYSIS
OF THE PILOT'S TASK.**—In: The first European
congress of aviation medicine, p. 227-233. *Aero-
medica acta* (Soesterberg, Netherlands), Special
edition, 1957. In English. DNLM

An attempt is made toward creation of a system of interrelated psychological constructs which describes the behavioral phenomena and their somatic correlates observed in man during flight. A systematic frame of reference is developed which stresses the role of instinctive experience and functioning on an animal level as important factors to a successful adaptation to the requirements of flying.

7731

Forgays, D. G.,
and B. I. Levy
**COMBAT PERFORMANCE CHARACTERISTICS AS-
SOCIATED WITH CHANGES IN THE MEMBERSHIP
OF MEDIUM-BOMBER CREWS.**—*Air Force Per-
sonnel and Training Research Center, Lackland Air
Force Base, Tex.* (Project no. 7713, Task no. 77225).
Report no. AFPTRC-TN-57-140, Dec. 1957. vi+18 p.
AD 146 414. UNCLASSIFIED

A team of military and civilian psychologists gathered performance data in 1953 during the last months of active conflict in Korea. Crew changes were recorded for each B-29 crew during initial crew training at Randolph Air Force Base, advanced crew training, and part of the combat tour in the Far East. The crews were divided into three groups, nearly equal in size, on the basis of the number of membership changes that had taken place. An analysis of variance technique was used in comparing the groups. The results indicated that crews with a medium number of membership changes during the 10-month period had better combat performance scores, in general, than the low- or high-change crews. Examination of the numbers of changes made in initial crew training and of those occurring later gave essentially similar results. (From the authors' abstract)

7732

Goldbeck, R. A.,
B. B. Bernstein, W. A. Hillix, and M. H. Marx
APPLICATION OF THE HALF-SPLIT TECHNIQUE
TO PROBLEM-SOLVING TASKS. — Jour. Exper.
Psychol., 53 (5): 330-338. May 1957.

DLC (BF1 J6, v. 53)

Experiments were conducted to test the efficiency of a method of trouble-shooting in which each check eliminates half the alternative components, and to determine the effects of instruction and training in the half-split technique. An apparatus simulating an electronic system was used. It was found that the half-split method was an aid to efficiency where system relationships were easily mastered, but that either relatively high subject ability or instructional aid was required for effective use of the method in solving complex problems. It is concluded that the ability to deduce from a system complex which units might be faulty is a prerequisite for application of the half-split technique.

7733

Gorelov, V. V.,
and V. M. Smirnov
[SOME FACTORS IN FLIGHT ACCIDENTS CONNECTED WITH HEALTH CONDITIONS OF THE PILOT] Nekotorye predposylki k letnym proisshествam, svyazannye s sostoyaniem zdorovia. — Voenno-meditsinskii zhurnal (Moskva), 1957 (4): 52-55. April 1957. In Russian.

DLC (RC970.V55, v. 1957)

To determine the health conditions of fliers before flights presents the biggest problem for the flight surgeon. The principal conditions to be looked out for are the possibility of syncope, cerebral autonomic vascular crises, and epilepsy. Syncope may occur during the flight when the cabin loses its hermetic seal. This will lead to anoxia and injury to interoceptors. Cardiovascular disturbances may be caused by fatigue, alcohol consumption, psychotrauma, etc. Epilepsy is not very frequent and, if diagnosed, renders the pilot ineligible for flights. Vomiting is frequent in persons with vestibular disturbances and gastrointestinal disorders, less so in persons with organic brain injuries. Various neuroses can also be included among the conditions that exclude the pilots from further flights.

7734

Griffis, L. E.
SPECIFIC REQUIREMENTS OF THE STRATEGIC

AIR COMMAND.—In: Symposium: physical standards and selection, p. 128-131. Randolph Air Force Base, Tex.: Air University, 1957. AD 144 144

UNCLASSIFIED

Physical evaluation and selection are discussed as they relate particularly to the requirements of the Strategic Air Command (SAC). SAC's present combat crews, lead crews, and even select crews have not been organized on the basis of physical standards. These standards have played some part, sometimes a large part, in determining who was available for selection, but they have had little to do with the actual selection process. Commanders have used other criteria, ingredients, or qualities to make this selection. The foremost criteria at present in SAC are leadership, tactical ability, training, and proficiency. It is suggested that there is good medical justification for separate physical standards for different aircraft or different crew positions and that the physical standards to be required for new weapon systems be determined. A plea is made for improvement in the original selection system for cadets. It is also hoped that medical men can be more tolerant and learn to live with the problems that exist in many of the trained crews who, in spite of physical defects, are probably capable of getting bombs over the target.

7735

Heglin, H. J.
MEASUREMENT OF ALL-WEATHER INTERCEPTOR PILOT PERFORMANCE (F-86D). III. PRELIMINARY INVESTIGATION OF ACCURACY AND RELIABILITY OF OSCILLOGRAPH RECORDS.—Air Force Personnel and Training Research Center. Operator Lab., Randolph Air Force Base, Tex. (Project no. 7716, Task no. 57051). Technical Memorandum no. OL-TM-57-8, July 1957. vii+63 p. AD 161 716

UNCLASSIFIED

Oscillograph records were obtained for the simulator rides of 69 representative F-86D pilots. It was planned that these would provide continuous data which would check and supplement the film records and experimenter observations as possible performance criteria for all-weather interceptor pilots. Oscillograph records would appear to be useful in the evaluation of pilot simulator proficiency, but only with considerable investment of effort and technical competence. This suggests that such measures would be impractical for operational squadron use unless some system is devised wherein data collection is properly monitored and measures obtained by the squadrons at different air bases are sent to a central processing point for analysis. (From the author's summary and conclusions)

7736

Karraker, W.
PROBLEMS OF CREW MANAGEMENT.—Skyways, 16 (6): 16, 31-32. June 1957.

DLC (TL501.S634, v. 16)

The following four general problems of flight-crew management are discussed: (1) flight safety, (2) flight service, (3) flight efficiency, and (4) employee satisfaction. A controlled experiment is urged designed to test the present method of crew composition and scheduling against the performance of a group of crews regularly scheduled as units for an adequate period of time for study. It is suggested that such a testing procedure will support the hypothesis that flight safety, service, efficiency, and employee satisfaction will be markedly improved by the establishment of stable flight crews in civil aviation.

7737

Khodanov, I. I.

[THE EFFECT OF HETEROPHORIA ON FLIGHT TRAINING] Vliianie geteroforii na letnoe obuchenie [Abstract]. — Voenno-meditsinskiy zhurnal (Moskva), 1957 (7): 78. July 1957. In Russian.

DLC (RC970.V55, v. 1957)

The performance of 44 pilots with horizontal heterophoria was evaluated in test flights on LAK-11 planes. The pilots were divided into 3 groups according to the degree of heterophoria: Group I (16 men), 1.5°-2.0°; Group II (9), 2.5°-3.0°; and Group III (9), 3.5°-8.0°. The performance of Group I did not differ from that of the controls. Group II had a low score, particularly in situations requiring above average mental and visual alertness. In Group III, 8 of 9 pilots were disqualified for further flights. Heterophoria of more than 2° may render pilots unqualified for flights, particularly persons with a weakened nervous system.

7738

Krumboltz, J. D.

PHYSICAL PROFICIENCY AS A PREDICTOR OF LEADERSHIP.—Air Force Personnel and Training Research Center, Lackland Air Force Base, Tex. (Project no. 7719, Task no. 17009). Research Report no. AFPTRC-TN-57-60, May 1957. vi+21 p. AD 126 391

UNCLASSIFIED

Seven measures of physical characteristics and proficiency were used as predictors of leadership: height; weight; medicine ball throw; pull-ups; hurdle run; hop, step and jump; and the 250-yard shuttle run. Air Force populations considered were officer candidate school cadets, student officers in preflight training before going to pilot or observer school, and aviation cadets. The results showed that the tests were valid predictors of the leadership criterion. The relationship appears approximately linear throughout the entire range of talent, and validities computed with about the lower 7% of cases eliminated were no less than expected from the resulting restriction in range.

7739

Marx, H. H.

[ESTIMATE OF THE PHYSICAL CAPACITY BY THE "SCHELLONG-TEST" AND ERGOSPIROGRAPHY] Beurteilung der körperlichen Leistungsfähigkeit mittels "Schellong-Test" und Ergospirographie.—Sportmedizin (Freiburg im Breisgau), 8 (6): 141-148. June 1957. In German. DNLM

Findings from ergospirographic measurements, electrocardiogram, and blood pressure examination in 22 subjects showed that the ergospirograph and behavior of the pulse rate were most valuable for evaluation of physical capacity, while the "Schellong-Test" did not contribute to differential evaluation of the physical condition in athletes.

7740

Mink, W. S.

AIR CREW COORDINATION.—Flying Safety, 13 (6): 8-9. June 1957. DLC (UG633.F43, v. 13)

Several incidents and accidents are briefly reported which were caused by a lack of crew coordination. A coordinated aircrew functioning together as a single man is a primary requirement for successful flight. The crew members must be trained not only in all phases of their own work but in every aspect of each other's work that touches their own.

Thus, in an emergency a well coordinated crew is capable of coping with the situation.

7741

North, W. E.

AN ANALYSIS OF J-47 JET MECHANIC CHECKLIST RESPONSES FOR RESPONSE SET AND CONSISTENCY.—Jour. Applied Psychol., 41 (2): 114-120. April 1957. DLC (BF1J55, v.41)

A checklist to determine the frequency of performance and the degree of assistance received or given on 220 job tasks was administered to 70 J-47 (engine) jet mechanics. Questions were divided into 4 sections which were presented in counterbalanced order within the group. Analysis of responses revealed no evidence of the occurrence of response set (a tendency to consistent use of one response category) towards the end of the checklist. Review of 50 checklist questions during subsequent interviews of 39 of the mechanics revealed no evidence of a decrease towards the end of the checklist in the consistency of responses obtained by checklist or interview. The checklist apparently provided adequate coverage of the tasks performed by J-47 jet mechanics.

7742

Porton, W. M.

[THEORETICAL CONSIDERATIONS ON THE PATHOGENESIS OF SPONTANEOUS IDIOPATHIC PNEUMOTHORAX] Een theoretische bijdrage over de pathogenese van de spontane idiopathische pneumothorax.—Nederlands militair geneeskundig tijdschrift ('s-Gravenhage), 10 (3): 74-84. March 1957. In Dutch. DLC (RC971.N4, v. 10)

Reports of spontaneous pneumothorax in the medical literature are reviewed in regard to incidence, etiology, symptomatology, treatment, and recidivism. In view of precipitating conditions in flight, such as increase in the intrathoracic pressure, positive pressure breathing, etc., candidates with a previous history of healed spontaneous pneumothorax should be rejected by the aeromedical selection board. In case of an active flier suffering a spontaneous pneumothorax, the decision on flight fitness should be based on a thorough aeromedical examination after recovery aimed at uncovering a predisposing physiological condition. If the flier is returned to flight duty, precautions such as flying with a co-pilot or avoidance of maneuvers involving high g forces, should be taken.

7743

Powell, T. J.

MEDICAL SELECTION FOR HIGH PERFORMANCE AIRCRAFT.—Canad. Services Med. Jour. (Ottawa), 13 (6): 349-354. June 1957. DNLM

The Royal Canadian Air Force maintains very high standards for the medical selection of an aircrew. Personnel must be free of defects which may be compatible with civilian life, but in the aircrew shorten their lives considerably. Medical selection is continuous throughout the airman's service; annual and special examinations insure continued fitness. Special examination of older pilots has proven most useful, since of the 243 examined, 19 (8%) were not allowed to return to full flying duties and only 4 of those passed are known to have failed in their conversion training or subsequent operations. In medical selection nothing is as valuable as a careful physical examination by a competent medical officer,

along with ancillary examinations (ophthalmology, cardiology).

7744

Rose, H. W.

EYE STANDARDS FOR VISUAL ACUITY, DEPTH PERCEPTION, AND MUSCLE BALANCE. — In: Symposium: physical standards and selection, p. 55-60. Randolph Air Force Base, Tex.: Air University, 1957. AD 144 144 UNCLASSIFIED

Visual standards in aviation medicine point up the differences between fitness for flying and the desirability of a cadet or pilot for certain kinds of military flight. Re-examination and change of our requirements for uncorrected and corrected visual acuity, permissible refractive error, depth perception, and horizontal heterophoria standards are suggested, based upon the findings of job analysis. The time has come to give up the concept that each pilot is either fit for all aircraft or unfit for flying. Let us not require the outstanding pilot to be visually perfect if such wish for perfection is not supported by validation of standards. We should be more stringent in visual requirements for some high-performance aircraft, but for other tasks of flying more lenience is indicated. (Author's summary)

7745

Sells, S. B.

THE ESTABLISHMENT OF NORMS. — In: Symposium: physical standards and selection, p. 77-90. Randolph Air Force Base, Tex.: Air University, 1957. AD 144 144 UNCLASSIFIED

A summary is presented of a conference on the establishment of norms relative to physical standards and selection. The discussion group attempted to analyze research problems incident to providing supporting data for standards involved in initial selection and subsequent examination. They identified three separate purposes which standards might serve, namely, safety, longevity, and proficiency. These purposes suggest the criteria appropriate for estimation of relevance and risk. In considering research design for normative data collection, they presented preliminary discussions and recommendations on six important topics: (1) analysis of present physical standards in relation to the three major purposes; (2) reliability and statistical adaptability of measurements; (3) conditions of flight; (4) research design and safety and longevity norms; (5) research design for proficiency norms; and (6) philosophy of physical standards. (From the author's summary)

7746

Torrance, E. P.,

C. H. Rush, H. B. Kohn, and J. M. Doughty
FACTORS IN FIGHTER-INTERCEPTOR PILOT COMBAT EFFECTIVENESS. — Air Force Personnel and Training Research Center, Lackland Air Force Base, Tex. (Project no. 7680, Task no. 76803). Technical Report no. AFPTRC-TR-57-11, Nov. 1957. vi+34 p. AD 146 407 PB 138 239

This study was undertaken to determine why some pilots were more successful in air-to-air combat over Korea than other pilots of similar backgrounds. It was found that rank, age, time in service, and flying time were all significantly and positively related to claim scores. Scores made on selection and classification tests at the time of selection did not effectively differentiate pilots according to relative degrees of effectiveness in scoring claims. The follow-

ing Life Experience Inventory scales differentiated the aces from the nonaces: Testing-the-Limits, Freedom from Childhood Neurotic Behaviors, Early Independence Training, Social Adjustment, and Risk-Taking. On the basis of Rorschach data, aces were found to be more productive, less rigid, and more highly organized in their perceptions than nonaces. The aces generally exerted unusual efforts to obtain assignments to fighters, F-86s and/or combat in a fighter-interceptor organization. A variety of leadership and organizational factors were also identified as possibly affecting the combat effectiveness of these pilots. (From the authors' abstract)

7747

Trites, D. K.,

and A. L. Kubala

CHARACTERISTICS OF SUCCESSFUL PILOTS. — Jour. Aviation Med., 28 (1): 34-40. Feb. 1957.

DLC (RC1050.A36, v. 28)

Using a longitudinal and concurrent approach, personal characteristics and measurements of effectiveness were collected for two groups of pilots. The 65 subjects of Group I were studied during combat. For Group II, containing from 200 to 400 subjects, comparisons were made of personal characteristics obtained during training with effectiveness reports collected several years after graduation. As presently measured the successful pilot tends to be generally well-adjusted, healthy, adept in social interactions, and not unduly concerned with self-advancement. In addition, he is an easily trained, able, and competent flyer. Of these characteristics, those which apparently can be assessed with some degree of success during training are: general adjustment level, flying aptitude and educability, need for self-enhancement, freedom from symptoms of maladjustment, and likeability. Because the preceding list accounts for only a small part of the totality representing a successful pilot, the discovery of additional personality factors will be a continuing challenge to psychologic research in support of aviation medicine. (Authors' summary, modified)

7748

Trusov, M. S.

[CHANGES OF THE VISUAL ACUITY AND THE REFRACTORY ANOMALIES IN FLYING PERSONNEL] Ob izmenenii ostroty zreniia i anomalii refraktsii u lits letnogo sostava. — Voenno-meditsinskii zhurnal (Moskva), 1957 (11): 53-55. Nov. 1957. In Russian. DLC (RC970.V55, v. 1957)

Under observation were 69 fliers with myopia and myopic astigmatism, and 39 fliers with hypermetropia and hypermetropic astigmatism. From the myopic group 32 persons were disqualified from further flights during the first 4 years, 9 persons after 6 years, and 6 persons after 8 years of flying. Those remaining had myopia not higher than 0.5 D. Hypermetropic persons are removed from flight duty at the age of 40-42 years, at the peak of their physical development. The main reasons for the decrease of visual acuity in flying personnel are refractive errors (according to the author, 88% of disqualified fliers). If the visual acuity equals 0.9 at the age of 19-22 years, it will seldom be over 0.7-0.8 at the age of 40-45 years. This is particularly true in hypermetropic and astigmatic persons. It is suggested that hypermetropia should not exceed 1.0 D and myopia 0.5 D in candidates for aviation schools.

7749

U. S. Senate

S.1045: A BILL TO AMEND THE CIVIL AERONAUTICS ACT OF 1938, AS AMENDED, BY ADDING THERETO NEW PROVISIONS RELATING TO AVIATION MEDICINE.—U. S. Senate, 85th Congress, 1st Session. Hearings before a Subcommittee of the Committee on Interstate and Foreign Commerce, April 1, 2, and 3, 1957. iii+150 p.

DLC (RC1054.U5A54, 1957)

Testimonies, discussions, and correspondence are presented by various specialists in aviation, medicine, and aviation medicine (both civilian and military) indicating agreement or disagreement with the view that the Bill (S.1045) to amend the Civil Aeronautics Act of 1938 (by establishing a new office in the Civil Aeronautics Administration to develop medical requirements and evaluate the physical fitness of airmen) would improve safety in commercial aviation.

e. Duties

7750

Escajeda, R. M.

ANTI-SUBMARINE WARFARE AND AVIATION MEDICINE.—Contact (Pensacola), 15 (1): 29-30. 1957.

DNLM

The major responsibility of the flight surgeon attached to an anti-submarine warfare squadron (team of aircraft carrier, destroyer, helicopter) is to indoctrinate pilots in general health, first aid, and physiological safety problems. He works to promote morale and efficiency within the squadron which hinge directly on the caliber of training. Since most of the time is spent operating from a carrier, all of the problems of deck operation become his concern, and he must be alert to detect signs of fatigue in aviators who are involved in slow-speed, low-level flying under constant alertness for long periods of time.

7751

Harding, F. D.

A SURVEY OF INCENTIVES FOR HAZARDOUS OR UNPLEASANT WORKING CONDITIONS.—Air Force Personnel and Training Research Center, Lackland Air Force Base, Tex. Development Report no. AFPTRC-TN-57-115, Aug. 1957. v+23 p. AD 134 240 PB 134 359

Incentives for hazardous or unpleasant work are based on a concept of supply and demand. This is especially true when the incentive is monetary. It is possible that supply and demand is reflecting other influences such as actuarial information of shortened job tenure caused by death, injuries, and bodily deterioration; or a sense of fairness in the desire to pay a fair return for services offered. Special incentive pay to military personnel who are exposed to radiation may not be feasible for several reasons. It can be expected that adequate precautions will be taken to eliminate the hazard involved. Any flying personnel who are involved will already be receiving incentive pay and thus are prohibited from accepting additional incentive pay. Because of this and other characteristics of nuclear activity, non-monetary incentives may prove more effective.

7752

McNeely, G. B.

THE BUSH FLIGHT SURGEON'S PROBLEMS.—Illinois Med. Jour., 3 (1): 29-30. Jan. 1957. DNLM

The bush flight surgeon takes care of class II and III pilots (student, private, and commercial pilots) in contrast to the flight surgeon who examines class I (airline transport pilots). The bush flight surgeon is also the family physician of the pilot and his family.

7753

Stapp, J. T.

ROLE OF THE AIR FORCE VETERINARIAN IN RESEARCH.—Military Med., 120 (3): 205-209. March 1957. DLC (RD1.A7, v. 120)

Also published in: Far East Air Forces Command Surgeon's Newsletter, 3 (3): 7-13. April-May 1957. DNLM

The objectives of veterinary medicine in Air Force research are twofold. First, to provide a stand-by group of qualified staff officers capable, in the event of emergency, to serve air commanders and surgeons as technical advisors in certain defensive and protective aspects of nuclear, biological, and chemical warfare. Secondly, veterinarians support air force research by providing professional service and assistance for all projects involving foods or animals, and further by actively participating as research team members on aero-medical projects. The educational background of veterinarians particularly qualifies them for work in aeromedical research. Current research projects in which animals are employed as human substitutes include those dealing with high altitude, deceleration, acceleration, space flight, nuclear energy, and cardiac research.

7754

Wilbur, C. E.

THE FLIGHT SURGEON AND AIRCRAFT ACCIDENTS.—Aeronaut. Engin. Rev., 16 (3): 57-59. March 1957. DLC (TL501.A326, v. 16)

The role of the flight surgeon in aviation accident prevention is twofold: his analysis of so-called pilot-error accidents, and his constant and skilled supervision of the pilot's flight readiness. Indoctrination of the pilot in his flying task is also a duty of the flight surgeon.

f. Attitudes and Morale

7755

Blake, R. R.,

H. Helson, and J. S. Mouton

THE GENERALITY OF CONFORMITY BEHAVIOR AS A FUNCTION OF FACTUAL ANCHORAGE, DIFFICULTY OF TASK, AND AMOUNT OF SOCIAL PRESSURE.—Jour. Personality, 25 (3): 294-305. March 1957. DLC (BF1.J66, v. 25)

This is a more detailed description of work published previously as part of a report dealing with adaptability screening of flying personnel. See item no. 6183, vol. V.

7756

COMPLACENCY IN THE COCKPIT.—Skyways, 16 (7): 12-14, 42-43. July 1957. DLC (TL501.S634, v. 16)

A panel discussion is presented of various factors leading to pilot complacency, the dangers resulting from this overconfidence, and the many ways to prevent its occurrence. The panel consisted of pilots, chief pilots, a supervising inspector, and a safety agent for the Civil Aeronautics Administration. It was concluded that the high level of proficiency required for pilots can be maintained and pilot complacency in

the cockpit overcome through self-discipline and practice, quizzing each other, availing themselves of instrument checks by Civil Aeronautics Administration inspectors or chief pilots, and by practicing emergency procedures, instrument flying, and approaches.

7757

Glanzer, M.,

and R. Glaser

TECHNIQUES FOR THE STUDY OF TEAM STRUCTURE AND BEHAVIOR. I. ANALYSIS OF STRUCTURE.—American Inst. for Research, Pittsburgh, Pa. (Contract N7onr-37008, Project no. NR-154-079). [Report no. AIR-26-57-FR-153], June 1957. [49] p. AD 135 412 UNCLASSIFIED

An examination is made of the work done on the structure of task-oriented groups or teams and the techniques which are suggested for solutions of related problems. Emphasis is placed on communication structure. These cover group, subgroup, and individual indices; enumeration of structures which concern matrices with binary entries; comparison of groups; analysis of subgroups; assignment of individuals in subgroups; and other approaches which include graph theory and the logic of relations. In most cases the techniques were devised for the relationships of choice and rejection, but they can be applied directly to relationships such as "communicates with". Simple examples of the application of the techniques are included in the discussions. The work contributes to the solution of the problems in that it suggests techniques (1) for the reduction of the complex problems involved in group functioning to mathematical form, (2) for the analysis and manipulation of the interactions of an entire group, and (3) that take account of indirect as well as direct connections in a group. (AD abstract) (46 references)

7758

Glanzer, M.,

and R. Glaser

TECHNIQUES FOR THE STUDY OF TEAM STRUCTURE AND BEHAVIOR. II. EMPIRICAL STUDIES OF THE EFFECTS OF STRUCTURE.—American Inst. for Research, Pittsburgh, Pa. (Contract N7onr-37008, Project no. NR-154-079). [Report no. AIR-26-57-FR-154], June 1957. [38] p. AD 135 412 UNCLASSIFIED

A report is given of the laboratory studies of group behavior in communication networks. A discussion is presented of (1) initial work; (2) the variations and repetitions of the basic procedures; (3) further studies which extend the methods to investigate the effects of variables such as amount and distribution of information, problem complexity, and type of leadership, new concepts such as saturation and independence of positions, and the four-man group; and (4) studies from the group network laboratory which emphasize pure structural characteristics and which furnish data for thorough mathematical analyses. The special characteristics of these network studies seem to be interdiction of certain channels, ignorance concerning other positions, freedom of sending, and necessity of each member. (AD abstract)

7759

Johnson, L. C.

ATTITUDES AND MOTIVATIONS OF TEST PILOTS.—U. S. Armed Forces Med. Jour., 8 (5): 718-724. May 1957. DLC (RC970.U7, v. 8)

In this study 12 test pilots were interviewed and 21 test pilots answered an attitude-motivation questionnaire. Results showed that test pilots take their jobs because of the diversified experience it offers, while prestige and the desire to explore the unknown were almost as important. Nearly all were greatly enthusiastic about their jobs, but most thought that more formal training could have helped in qualifying for the job. All but one individual expected to continue as long as possible as test pilots.

7760

Meerlo, J. A. M.

MENTAL DANGER, STRESS AND FEAR. II. MAN AND HIS MORALE.—Jour. Nervous and Mental Disease, 125 (3): 357-379. July-Sept. 1957.

DLC (RC321.J83, v. 125)

The psychological traits of individual and group morale are defined and studied. Psychological and physical factors which influence the level and maintenance of morale are elaborated upon. These factors include fear, latent panic, attitude towards danger and stress, the degree of anticipation and mobilization, the interplay between external and internal dangers, the quality of the group and of the leader, and physical fitness. (52 references)

7761

Nelson, P. D.

A NOTE ON FACTORS RELATED TO GROUP STATUS.—Naval School of Aviation Medicine, Pensacola, Fla. (Research Project no. NM 16 01 11, Subtask 4). Report no. 3, July 26, 1957. ii+5 p. AD 144 097 UNCLASSIFIED

When the members of a group are high in morale and talk frequently with other people, the tendency is for satisfaction with one's own group to exist. When members of a group are low in morale and talk with other people frequently, the tendency is for such members to express preference for another group. The characteristics of the members of the group for which such preference is expressed are the following: high morale, frequent communication with other people, and high satisfaction with their own group. (Author's findings)

7762

Nelson, P. D.

A STUDY OF THE OFFICER FLIGHT STUDENT WITH PARTICULAR ATTENTION BEING GIVEN TO THE AVIATION OFFICER CANDIDATE AS AN OFFICER.—Naval School of Aviation Medicine, Pensacola, Fla. Special Report no. 57-25, Oct. 1, 1957. [23] p. AD 151 419 UNCLASSIFIED

An investigation is made to determine (1) the adequacy of the Aviation Officer Candidate (AOC) as an officer in flight training and, more specifically, (2) how the AOC compares with other officer students in terms of his motivation to fly, his sense of responsibility, and his sense of Naval orientation. Results reveal that the AOC (a) appears to be at least as well motivated to fly as other officer students (although they are judged by instructors to be less well motivated), (b) has relatively little opportunity at the primary flight training field to exercise officer-type responsibility, and (c) has a problem on Naval orientation which appears to be not so much one of his training as it is his lack of knowledge concerning "practices" of other officers. (Author's summary, modified)

7763

Rhemrev, N. A. N. V.

AN INVESTIGATION ON MORALE.—In: The first European congress of aviation medicine, p. 235-237. Aeromedica acta (Soesterberg, Netherlands), Special edition, 1957. In English. DNLN

Peacetime morale in three fighter squadrons was investigated by means of a sociometric test used by Jenkins in World War II. The test was administered twice with a 10-month interval between test and retest. Diagrams were made of the relationship between the pilots in the area of flying capabilities and their emotional relationship. Other factors considered were the number of disciplinary offenses, number of sick calls, and the number of days lost through illness. Significant findings were that in peacetime the morale of a squadron is not determined primarily by the squadron commander's flying abilities but by his leadership qualities. The value of these factors in peacetime is limited and does not extend to predictions regarding the squadron's effectiveness in wartime.

7764

Sarnoff, C. A.

MEDICAL ASPECTS OF FLYING MOTIVATION: A FEAR-OF-FLYING CASE BOOK.—School of Aviation Medicine, Randolph Air Force Base, Tex. [Unnumbered Report], Oct. 1957. viii+175 p. AD 149 701

UNCLASSIFIED

The purpose of this book is to give the flight surgeon a working knowledge of the many facets of aviation medicine in which flying motivation plays a part. Over 50 full-case reports are presented. The proper handling of cases from the standpoint of Air Force regulations and medical indications are discussed, and a system for categorizing patients is provided. The table of contents lists the following sections, which are provided with representative chapters: (I) Air Force regulations, (II) anxiety, (III) flying stress, (IV) reactions to flying stress, (V) other aspects of reactions to flying stress, and (VI) non-aviation psychiatric problems.

7765

Voas, R. B.,

J. T. Bair, R. K. Ambler, and James R. Smith
MORALE AMONG FLIGHT STUDENTS WHO FAIL TO COMPLETE TRAINING.—Naval School of Aviation Medicine, Pensacola, Fla. Special Report no. 57-22, July 29, 1957. iii+[11] p. AD 154 632

UNCLASSIFIED

As part of their separation procedure, dropped flight students completed a questionnaire covering their attitudes about different aspects of the training program. Although students who flight-failed were more critical of the program than those who withdrew voluntarily, the majority of students regardless of type of attrition felt they received fair treatment and would recommend the program to their friends. Included is an appendix with the student attitude questionnaire and representative tabulations of attitudes.

7766

Webb, W. B.

CADET MORALE TODAY AND THREE YEARS AGO.—Naval School of Aviation Medicine, Pensacola, Fla. Special Report no. 57-10, March 14, 1957. [15] p. AD 134 338

UNCLASSIFIED

Nineteen of twenty questions of the morale inventory (administered in May 1953 to 121 cadets gradu-

ating from the U. S. Naval School, Pre-Flight) were presented to two classes of cadets (one consisting of men with two years of college training to be commissioned at the end of their training program; the other composed of men with four years of college to be commissioned at the end of pre-flight) one week before graduation from pre-flight and during the month of November 1956. This was done to determine (1) how cadet morale of today compares with that of three years ago and (2) any differences between the classes studied. Scores were not significantly different for the two classes. Trainees under the present peacetime conditions reveal higher morale than trainees of the late wartime conditions of Korea. Possible influences accounting for this finding are outlined.

7767

Willingham, W. W.

A STUDY OF MORALE IN PRE-FLIGHT AND PRIMARY FLIGHT TRAINING.—Naval School of Aviation Medicine, Pensacola, Fla. Special Report no. 57-17, July 12, 1957. [9] p. AD 143 644

UNCLASSIFIED

The Sentence Completion Form (disguised as a personality test with none of its sentence "stems" directly bearing on naval air training) was administered to pre-flight cadets and officer students in primary flight training. It was possible to analyze the form of gripes voluntarily voiced by these groups. It was observed that pre-flight cadets make a wider variety of specific complaints than do officers in primary flight training whose complaints focalize strongly on "waiting for hops".

g. Personal Factors

(Age, Sex, Race, Body Measurements, etc.)

7768

Adams, T.,

W. R. Beavers, B. G. Covino, R. W. Elsner, and R. J. Hock

RACIAL VARIATIONS TO A STANDARDIZED COLD STRESS [Abstract].—Federation Proceedings, 16 (1, part I): 1. March 1957. DLC (QH301.F37, v. 16)

Seven healthy, adult representatives of three racial groups (Negro, Caucasian, Eskimo) were exposed nude for two hours in a cold room maintained at 17° C. After 55 minutes of exposure both the Caucasian and Eskimo subjects showed a rise in metabolism of approximately 22 Cal./hr./m.² from control levels of 40 and 55 Cal./hr./m.², respectively. In the Negro subjects the body heat production increased only 10 Cal./hr./m.² after 85 minutes in the cold room, from a control level of 38 Cal./hr./m.². The slight increase, relatively late in the experimental exposures, suggests a difference in shivering threshold between the Negroes and the other two groups. In addition, the Eskimo subjects did not lose as much body heat before shivering and increasing body heat production. (From the authors' abstract)

7769

Barter, J. T.

ESTIMATION OF THE MASS OF BODY SEGMENTS.—Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 57-260, April 1957. iv+10 p. AD 118 222

PB 131 447

A reanalysis is presented of the data concerning the mass of body segments published in WADC TR 55-159, Space Requirements of the Seated Operator, Dempster, 1955 (see item no. 4039, vol. IV) and in The Center of Gravity of the Human Body as Related to the Equipment of the German Infantry, Braune and Fischer, 1889. Regression equations for computing the mass of body segments for any known body weight are presented along with data on estimated weights of body segments of Air Force flying personnel. (Author's abstract)

7770

Botwinick, J.,

J. F. Brinley, and J. E. Birren

SET IN RELATION TO AGE.—*Jour. Gerontol.*, 12 (3): 300-305. June 1957. DNLN

Set was studied as a function of age by comparing two age groups with respect to the relationship between reaction time and an irregularly presented series of preparatory intervals. One age group comprised 27 subjects aged 20 to 36 years, and the other, 27 subjects aged 61 to 83 years. Auditory reaction times were measured for each subject by presenting a 1000-cycle, 85-decibel tone through earphones for 0.20 seconds. It was found that the largest age differences in relation to time were with the shortest preparatory intervals. This may be due to the large age differences in reaction time which occurred when a long interval preceded a short one. Hypotheses suggested were either that the elderly group required more time for preparation, or that they required more time to overcome the effects of an overestimated interval of time. (Authors' summary, modified)

7771

Bromley, D. B.

SOME EFFECTS OF AGE ON THE QUALITY OF INTELLECTUAL OUTPUT.—*Jour. Gerontol.*, 12 (3): 318-323. July 1957. DNLN

A creative response test and a multiple choice test of proverb interpretation were administered to three different age groups (17-82 years of age) matched on several relevant variables. A theory of normal intellectual decline with age was proposed in which the overall impairment was due to (a) a loss of performance potentialities which govern mainly the quantity of output, and (b) a loss of performance evaluation which governs mainly the quality of output. From this it was deduced that if the quantity of output was kept constant by giving the subjects an opportunity to offer interpretation for all the proverbs, then an increase in age after maturity should be associated with a decrease in quality of output. Statistical tests on the observed data confirmed the deduction. (Author's summary, modified)

7772

Brown, Ruth A.

AGE AND 'PACED' WORK.—*Occupational Psychol.* (London), 31 (1): 11-20. Jan. 1957.

DLC (T58.A2N35, v. 31)

An experiment was performed to discover the nature of the difficulties that arise in jobs where the speed of performance is rigidly paced by the machinery used, and at what ages they become apparent. Subjects worked for 10 minutes paced and 10 minutes unpaced at a grid-matching task. Group A did the paced task first followed by the unpaced; and Group B did the tasks in the reverse order.

Mean ages ranged from 22.6 to 74.1. From the results it seems possible to make these two observations: (a) A pace set for men in their twenties and thirties can be maintained in the forties but only with an effort, which would seem likely in the course of time to cause strain; for people in their fifties this appears to be no longer possible. (b) Paced performance by the subjects was better than expected from their unpaced performance; this indicates that a supplementary factor improving paced performance is the speeding up of some of the longer cycle times.

7773

Churchill, E.,

and B. Truett

METRICAL RELATIONS AMONG DIMENSIONS OF THE HEAD AND FACE.—Antioch Coll., Yellow Springs, Ohio (Contracts AF 18(600)-30 and AF 33(616)-3841); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio (Project no. 7214, Task no. 71728). WADC Technical Report no. 56-621, June 1957. iv+127 p. AD 110 629 UNCLASSIFIED

Correlation data are presented for the head and face dimensions of two groups of United States Air Force personnel (flying personnel, including 41 dimensions based on a sample of over 4,000; WAF trainees, including 15 pairs of data based on a sample of 852). These data extend the useful information about these dimensions into the areas in which two or more dimensions are considered simultaneously. The utility of correlational statistics is discussed and procedures used in obtaining these data are described. In addition, coefficients of correlation for 820 pairs of flying personnel and 15 pairs of WAF data are given as well as multiple coefficients for each dimension and selected pairs of dimensions for flying personnel. Regression equations for estimating one dimension from values of another are listed for most pairs of flying personnel dimensions which are at least moderately well correlated. About seventy bivariate frequency tables are included. (Authors' abstract, modified)

7774

Churchill, E.,

A. Kuby, and G. S. Daniels

NOMOGRAPH OF THE HAND AND ITS RELATED DIMENSIONS.—Antioch College, Yellow Springs, Ohio (Contract no. AF 18(600)-30 and AF 33(616)-3841); issued by Wright Air Development Center. Aero Medical Lab. Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 57-198, April 1957. v+49 p. AD 118 162 PB 134 455

Dimensional data for the hands of both male and female Air Force personnel are summarized in tabular and graphic form. Intensities of the interrelationships within each of the two groups of dimensions are given in the form of tables of correlation coefficients. A series of tables supply estimates of the other dimensions for the appropriate ranges of values of hand length, hand breadth at metacarpale, hand breadth at thumb, and fist circumference. Nomographic charts are presented for estimating the related dimensions for all likely combinations of values of the hand lengths and breadths for both male and female Air Force personnel. Data obtained from other surveys of military personnel are summarized; these data suggest the applicability of the tables and charts presented here to the design of articles intended for almost any group of Air Force personnel. (From the authors' abstract)

7775

Churchill, E.,
and K. Bernhardt
WAF TRAINEE BODY DIMENSIONS: A CORRELATION MATRIX.—Antioch Coll., Yellow Springs, Ohio (Contract AF 33(616)-3841); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 57-197, April 1957. iv+75 p.
UNCLASSIFIED

Correlation coefficients expressing the degree of relationship between the 1830 pairings of 61 WAF basic trainee body dimensions are presented in this report. Slightly over two thousand multiple correlation coefficients expressing the degree of relationship between each of these dimensions and 36 pairs of them are also given. Regression equations for estimating all other dimensions from specified values of stature, of weight, and of stature and weight together are listed. Values computed from most of these equations are tabulated for the most frequently occurring values of stature, weight, and stature-weight combinations. This correlation material supplements the basic dimensional data given in Anthropometry of WAF Basic Trainees [see item no. 1279, vol. II of this bibliography] and with these data provides a basis for the planning and execution of design programs involving the body dimensions of these individuals. (Authors' abstract)

7776

Clay, H. M.
THE RELATIONSHIP BETWEEN TIME, ACCURACY AND AGE ON SIMILAR TASKS OF VARYING COMPLEXITY.—Gerontologia (Basel), 1 (1): 41-49. 1957.
DNLM

Performances on similar problem-solving tasks, varying in complexity, by 20-70 year old subjects were examined to determine the relationship between time scores, number of errors made, difficulty of task, and age. A rise was found in the error curve in the older age groups becoming steeper on the more difficult problems. On the easiest task, the times taken were similar from the 20's to the 60's, and then fell slightly in the seventies. On the next task there was a substantial rise in times in the 60's, again falling off in the 70's. This trend was observed again on three more difficult tasks, but the peaks were reached at an earlier age level in each case, so that while an increase in time occurred with age, the age level at which it was observed fell. In each case, there was also a marked decline in the times taken by the age groups above that at which the peak occurred, so that the oldest groups were in fact quicker than the youngest.

7777

Estes, H. D.
ADAPTABILITY SCREENING OF FLYING PERSONNEL: A LONGITUDINAL STUDY OF THE SOMATOTYPE IN MILITARY FLYING.—School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 57-139, Nov. 1957. 30 p. AD 152 818
UNCLASSIFIED

A group of 1,646 Army Air Force cadets for whom somatotype data were obtained on entering primary pilot training in 1943 was followed up through military personnel record files during 1954 to investigate the relation of the somatotype to military flying achievement. Results were as follows: (1) a significantly greater proportion of mesomorphs was found in this group than in the general population; (2) there

was no clear relation of somatotype to criteria of flying success; (3) although there is some evidence that high endomorphy is associated with psychiatric disturbance in military service, (4) low ectomorphy is associated both with psychiatric disturbance and with failure in flying. (Author's abstract) (49 references)

7778

Feifel, H.
JUDGMENT OF TIME IN YOUNGER AND OLDER PERSONS.—Jour. Gerontol., 12 (1): 71-74. Jan. 1957.
DNLM

Using the production method of temporal judgment, a group of older persons in their sixties significantly underestimated time intervals of 30, 60, 180, and 300 seconds when compared with a younger group in their twenties. There was a tendency toward increasing overestimation of the standard with regard to the longer time intervals of 180 and 300 seconds. Perception of the passage of time seemed relatively stable. Persons with a positive outlook on the future judged the time standard more accurately than those with a gloomy perspective. (Author's summary, modified) (20 references)

7779

Gilbert, J. G.
AGE CHANGES IN COLOR MATCHING.—Jour. Gerontol., 12 (2): 210-215. April 1957.
DNLM

Unselected subjects between the ages of 10 and 93 were given the Color Aptitude Test. Results showed a rise in separate and total color scores from the first decade (10-19 year group) to the twenties, with a subsequent steady decline. Shades of blue and green proved to be more difficult to discriminate between than shades of yellow and red at all ages, and the ability to discriminate between these shades likewise showed a more rapid decline with age. At all ages, but particularly in the sixties, wide individual differences were found in ability to match color. (Author's summary, modified)

7780

Grad, B.,
and V. A. Kral
THE EFFECT OF SENESENCE ON RESISTANCE TO STRESS. I. RESPONSE OF YOUNG AND OLD MICE TO COLD.—Jour. Gerontol., 12 (2): 172-181. April 1957.
DNLM

Old female mice showed a significantly higher mortality rate on exposure to cold than mature young females. Optimum temperature used was 6° to 7° C., although highly significant differences were observed at 9° to 11° C. Two-thirds of adapted old mice died after a week at a temperature which failed to kill any adapted young mice. Therefore, adaptation to cold is less effective in the old. Exposure to a temperature of 9° - 11° C. resulted in greater increases of oxygen consumption, food intake, and blood sugar in the young than in the old; body weight decreased significantly less in the young. Blood lymphocyte counts decreased more in the young than in the old and the erythrocyte count increased more in the young. No significant difference due to age was found in eosinopenic or neutrophilic response to cold. (Authors' summary, modified) (35 references)

7781

Hager, G.
[SCANNING PERFORMANCE IN PRESENCE OF

PHYSIOLOGICAL AGING] Die Umblickleistung beim physiologischen Altern.—Albrecht von Graefes Archiv für Ophthalmologie (Berlin), 158 (6): 598-604. 1957. In German. DNLM

The decline of scanning capacity with aging was investigated by means of a complex examination of 300 relatively healthy subjects covering a wide age range. The decline was demonstrated statistically. Lowered physical capacity for head and eye movements was found to be chiefly due to osseous changes in the spinal area and loss of elasticity in the aging muscles. There was also a decrease of mental flexibility as a result of slowing of photochemical transmission and neurophysiological as well as electrophysiological reactions in the retina, optical nerves, and the brain with progressive age.

7782

Hubach, J. C.

[THE "OLD" COMMERCIAL PILOT] De "oude" verkeersvlieger.—Aeromedica acta (Soesterberg, Netherlands), 5: 197-210. 1956/57. In Dutch, with English summary (p. 210). DNLM

The author advances the case for elevation of the retirement age of commercial pilots from 50± 5, as recommended by R. A. McFarland, to 55± 5 years. The statistical evidence, as well as the modern medical and physiological findings affirm that there should be no concern about the older pilot provided he meets the physical and flight competency standards. Consequently the upper retirement age limit can be fixed at 60 years.

7783

Kamin, L. J.

DIFFERENTIAL CHANGES IN MENTAL ABILITIES IN OLD AGE.—Jour. Gerontol., 12 (1): 66-70. Jan. 1957. DNLM

Thurstone's Primary Mental Abilities test battery was administered four times to two groups of 25 aged subjects and to a group of 25 young subjects. There was no effect of order of subtest presentation on subtest scores, and the differences in mean subtest scores within the aged groups were presumed to reflect differential changes in mental abilities with old age. The more severe deficits of aged subjects were in space and reasoning abilities, with lesser deficits in verbal meaning, number, and word fluency abilities. The scores of aged as well as young subjects

improved with successive testing, reflecting an effect of practice. Some evidence was found that an attempt to increase motivation improved the scores of some aged subjects on the word fluency test, but other test scores seemed unaffected by increased motivation. (Author's summary, modified)

7784

Siedlanowska, E.

[ARTERIAL HYPERTENSION IN THE MOUNTAIN CLIMATE] Nadciśnienie tętnicze w klimacie górskim.—Polski tygodnik lekarski (Warszawa), 12 (24): 915-919. June 10, 1957. In Polish, with English summary (p. 919). DNLM

In an examination of 1212 persons between 20-88 years of age living in a mountain village 800-900 meters above sea level, hypertension was found more frequently in younger persons than in those living at lower-altitude villages. The incidence of discomfort and symptoms gradually increases with age and after 60 years of age it appears more frequently in the mountain climate. Hypertension also appears more frequently in women. (Author's summary, modified)

7785

Towner, A. A.

THE YOUNG, THE OLD, AND THE BOLD.—Combat Crew (Strategic Air Command), 8 (2): 22-25. Sept. 1957. DLC (UG633.A15, v. 8)

A group of 313 Strategic Air Command pilots flying the same type of aircraft under comparable weather conditions was divided into four age categories, the youngest 22-25 years of age and the oldest 35 and over. The incidence of near accidents in the youngest age group was three times that of the older group. Motor skills, study habits, and judgment tend to improve with age. These attributes, in many cases, offset the declining physical prowess of flying and explain the increased percentage of waivers for physical defects found in the older more experienced group. No cut-off age for flying has been established because recognition was made between man's chronological and physiological age. Flight surgeons considering waivers for physical defects in older flyers evaluate each case and endeavor to determine whether the defect represents a compromise to flying safety. Most defects are found at the time of the regularly prescribed annual physical examination of flyers.

8. MEDICAL PROBLEMS AND PHARMACOLOGY

[Medical personnel under 7]

a. General

7786

AERONAUTICAL PREVENTIVE MEDICINE.—Edited by P. Bergeret et al. North Atlantic Treaty Organization. Advisory Group for Aeronautical Research and Development. xi+75 p. AGARDograph no. 36, Nov. 1957. AD 233 126 UNCLASSIFIED

Six papers, emphasizing the importance of industrial medicine in the air-operational system, are presented as submitted to the symposium held by the AGARD Aeromedical Panel in Washington, D. C., in November 1957. Pertinent papers are abstracted separately, see items no.

7787

Balakhovskii, I. S.,
and V. B. Malkin
[BIOLOGICAL PROBLEMS OF SPACE FLIGHT]
Biologische Probleme des Raumflugs.—Naturwissenschaftliche Rundschau (Stuttgart), 10 (5): 173-177. May 1957. In German. D.L.C. (Q3.N823, v. 10)

This is a German translation of an article which appeared in *Priroda*, 1956 (8): 15-21. The chief problems of space flight are reviewed, e.g., the effects of acceleration and deceleration forces, weightlessness, cosmic radiation, and the provision of conditions necessary for the preservation of life. Rocket flight experiments indicate that the organism is able to adapt to a certain extent to the lack of gravity. The effects of cosmic radiation are more difficult to evaluate since the genetic effects are mostly of the recessive type. Balloon experiments at high altitudes indicated some primary effects in form of degenerative plaques on the skin of experimental animals. Oxygen with admixture of inert gases is suggested for the cabin atmosphere. Removal of wastes from the atmosphere is probably achieved most effectively by plant life. Hermetic scaphanders are suggested in case the astronaut leaves the space ship either for repairs or to explore other planets.

7788

Coons, D. O.
AEROMEDICAL PROBLEMS IN OPERATING ALL-WEATHER AIRCRAFT: SOME CANADIAN OBSERVATIONS.—In: Aeronautical preventive medicine, p. 39-47. North Atlantic Treaty Organization, Advisory Group for Aeronautical Research and Development. AGARDograph no. 36, Nov. 1957. AD 233 126 UNCLASSIFIED

For the groundcrew and aircrew who are required to maintain and operate modern air weapons in an all-weather environment, there is need for aeronautical preventive medicine. Among the physiological problems encountered by the personnel are: fatigue, day/night cycling of habits, aging, climatic variations, overall stress of flying in high performance aircraft, noise, and socio-economic conditions. The aeromedical officer is responsible in assisting the flight safety officer in disseminating knowledge of safe flying practices, encouraging personnel to adopt healthy daily habits, providing protective clothing

and noise attenuators, and providing comfortable living accommodations.

7789

Desolles, H.
[COURSE IN OCCUPATIONAL MEDICINE] Cours de médecine du travail, 2nd revised edition. Vol. 2, 423 p. Paris: E. Le François, 1957. In French. DNLN (WA400.D487c, v. 2)

This textbook is one in a series of three volumes on occupational medicine written with the collaboration of many authors. It contains information on accidents (electric, burns, injuries); certain occupations (farming, aviation, mines); occupational pathology according to systems; and poisoning and special problems. Pertinent articles are abstracted separately (see items no).

7790

Desolles, H.
[OCCUPATIONAL MEDICINE AND OCCUPATIONAL DISEASES] Médecine du travail et maladies professionnelles. 163 p. Paris: Editions Médicales Flammarion, 1957. In French. DNLN (WA400.D467m)

This is a textbook aimed at students and practitioners of occupational medicine. The table of contents is divided into chapters dealing with the following subjects: protection of the worker's health, compensation for work accidents and occupational disorders, clinical study of occupational diseases, and reclassification and relation of the medical practitioner. Of special interest is chapter 5, pathology of aviators (p. 142-143), reviewing human reactions to high-speed, high-altitude flight. High altitude is responsible for such disorders as barotraumatic otitis and sinusitis, aeroembolism due to atmospheric depression, anoxia, hypocapnia, dyspnea, and mental disorders due to low oxygen pressure. Accelerations encountered during high-speed flight cause blackout, red-out, and labyrinthine disorders often leading to errors in task performance. Sonic, infrasonic, and ultrasonic vibrations produce traumatic vibratory syndromes with hearing disorders, physical and mental asthenia, headache, and hypotension. Preventive measures include the use of respiratory apparatus during flight and pressurized aircraft cabins.

7791

Fisher, G. F.
AERONAUTICAL PREVENTIVE MEDICINE IN THE UNITED STATES AIR FORCE.—In: Aeronautical preventive medicine, p. 1-10. North Atlantic Treaty Organization, Advisory Group for Aeronautical Research and Development. AGARDograph no. 36, Nov. 1957. AD 233 126 UNCLASSIFIED

This paper reviews some of the major aspects of the preventive medicine program in the U. S. Air Force, with emphasis on its aeronautical implications. Particular examples of the aeronautical aspects of communicable disease, sanitary and industrial hygiene engineering, occupational health, health education, and special weapons defense are presented.

7792

Hare, K.

AIR TRAVEL IN THE TROPICS: HEALTH HINTS.—Medical Press (London), 237 (8): 152-156. Feb. 20, 1957. DNLM

Air travel may be more fatiguing than other forms of travel because of the factors of anoxia, nervousness, and noise. Reduced atmospheric pressure at altitude causes expansion of body gases, notably in the stomach and bowel; therefore, the ingestion of gas-producing foods should be limited prior to or during the flight. Motion sickness brought about by the flight can be prevented and treated with hyoscine hydrobromide. In order to prevent postural edema due to aircraft vibration and seat design it is suggested that the passenger take short walks in the gangway of the aircraft and occasionally change his sitting position. Passengers requiring special attention are those suffering from cardiac insufficiency, pulmonary disorders, and anemia. Consideration is given to protective inoculation for smallpox, yellow fever, and cholera prior to international air travel. Suggestions are made for travelers in the tropics with reference to clothing, etc.

7793

HEALTH, WELFARE, AND SAFETY.—Air Force, 40 (8): 319-325. Aug. 1957. DLC (UG633.A65, v. 40)

The United States Air Force Medical Service provides services in preventive, general, and aviation medicine, dentistry, nursing, occupational and physical therapy, public health, food hygiene, sanitation, and nutrition. Research is also performed in all these fields. The medical service trains flight surgeons, plans and supervises programs to improve health, safety, and effectiveness of aircrews, evaluates personal, protective, and survival equipment, selects pilots, and studies the pathological and psychological aspects of flight and aerial combat. Problems studied are associated with the oxygen supply, decompression phenomena, fatigue, jet-engine noise, vision difficulties, in-flight food kits, bail-out and survival equipment, restraining harnesses, safety clothing, and effects of cosmic ray nuclei and high temperatures. Consideration is given to the air evacuation of patients during World War II, and the Korean campaign, accident prevention programs, and ground safety measures.

7794

Hopwood, L. P.

CONSERVATION OF THE TRAINED AIRMAN.—In: Symposium: physical standards and selection, p. 91-97. Randolph Air Force Base, Tex.: Air University, 1957. AD 144 144 UNCLASSIFIED

Discussions are presented on five critical and more or less tangible parts of the problem of air power capability to perform its vital mission. These include the present planning basis, competition standards, equipment performance, optimum but realistic peace-time economy, and the flying officer hump. The flying officer hump is considered the most vital component of the problem as it involves the older and more experienced personnel representing a considerable monetary investment. Such a pilot cannot be considered as simply just another number since, if he is lost on the grounds of physical standards, he must be replaced. At the same time, worry and morale are involved among those in his unit who know of his case. On the other hand, if he is not grounded, knowing his discrepancy makes him accident-prone. In someone

new, untrained, and unproven, the best indicated potential is needed. It is suggested that career and flying motivation be placed in higher priority than in the past, and that the commander and flight surgeon work together in the most complete teamwork for the older officer.

7795

Labarthe,

and [J. R.] Bourdon

[ORGANIZATION OF OCCUPATIONAL MEDICINE IN THE FRENCH AIR FORCE AND AIRCRAFT INDUSTRY] Organisation de la médecine du travail dans les formations militaires et les établissements industriels de l'aéronautique française.—In: Aeronautical preventive medicine, p. 21-27. North Atlantic Treaty Organization, Advisory Group for Aeronautical Research and Development. AGARDograph no. 36, Nov. 1957. In French, with English summary (p. 27) AD 233 126 UNCLASSIFIED

French occupational medicine legislation provides for preventive medical practitioners to supervise industrial medical examination during recruitment and periodically, evaluate work area conditions; study human behavior during work, and enforce general and industrial hygiene. This legislation also applies to the Air Force and to the aircraft industry. Aided by the Committees for Hygiene and Safety, the practitioner investigates occupational accidents and diseases, inspects installations to enforce proper hygienic and safety measures, trains rescue and fire commands, and indoctrinates workers in preventive medicine. Of special concern are the diseases found in the aircraft industry, such as the toxic effects of fuels, lead, and other chemical products handled by personnel, and deafness from exposure to aircraft noise. The flight surgeon is also responsible for protecting flying and non-flying personnel from noise hazards, and for handling the general and visual fatigue of radar operators.

7796

Marshall, K. G.

AVIATION MEDICINE.—McGill Med. Jour. (Montreal), 26 (1): 49-58. Feb. 1957.

DLC (R11.M25, v. 26)

The following problems of aviation medicine involving the adjustment of the individual to the unnatural environment of the upper atmosphere are briefly reviewed: (1) altitude sickness (anoxia), (2) decompression sickness, (3) gastrointestinal cramps, (4) boiling of blood, (5) hyperventilation, (6) aerotitis media and aerosinusitis, (7) frostbite, and (8) continuous paroxysmal coughing.

7797

Miller, E. F.

THE ELIMINATION OF HEADACHE, NAUSEA, AND DIZZINESS. REPORTED BY A STUDENT PILOT DURING INSTRUMENT FLIGHT STAGE BY MEANS OF REMEDIAL VISUAL TRAINING—A CASE STUDY. I. TRAINING PERIOD.—Naval School of Aviation Medicine, Pensacola, Fla. Special Report no. 57-29, Nov. 25, 1957. ii+9 p. AD 154 643 UNCLASSIFIED

The effectiveness of remedial visual training on the elimination of headache, nausea, and dizziness (reported by a student pilot while flying on instruments) was investigated. After visual training no symptoms were experienced while flying four simulated hops for a much longer duration (two hours)

than was previously necessary to provoke the symptoms (one-half hour). Further evidence of the effectiveness of the visual training was received in a subsequent letter from the subject after he had completed over thirty-five hours of actual instrument flying with complete freedom from discomfort and visual difficulties. The possible need for further research in this area is indicated. (Author's summary)

7798

Miller, E. F.

THE ELIMINATION OF HEADACHE, NAUSEA, AND DIZZINESS. REPORTED BY A STUDENT PILOT DURING INSTRUMENT FLIGHT STAGE BY MEANS OF REMEDIAL VISUAL TRAINING—A CASE STUDY. II. ONE YEAR LATER.—Naval School of Aviation Medicine, Pensacola, Fla. Special Report no. 57-29, Nov. 25, 1957. 11+5 p. AD 154 643 UNCLASSIFIED

A student pilot whose severe symptoms of headache, nausea, and dizziness had been eliminated a year earlier by remedial visual training was reexamined. It was revealed that certain visual functions (phoria, vergences, near point of convergence, stereopsis) had not changed significantly in amount from the values manifested directly after visual training. In addition, no symptoms had been experienced during the 250 hours of flying which included over thirty hours on instruments, ten cross country hops, and several exhausting low level flights of long duration. It was concluded that the results of this study indicate that visual training might be an effective and practical method of treating symptoms that are associated with the use of the eyes. (Author's summary, modified)

7799

Pissarew, D. I.

[NEUROLOGICAL EXPERIENCES IN AVIATION MEDICINE] Neurologische Erfahrungen der Luftfahrtmedizin.—109+2 p. Berlin: Ministerium für Nationale Verteidigung, 1957. In German. DNLM [WD735P8750, 1957]

This a German translation of the Russian work on aviation neuropsychiatry. The chapters are organized along the following topics: (1) Neurology within the field of aviation medicine, (2) investigation of the nervous system in aviators and parachutists, (3) investigation of the autonomic nervous system function in the older fliers, (4) theory of the so-called flying fatigue, (5) states of fatigue and exhaustion and their prophylaxis, (6) examination for flight fitness, and (7) general and individual prophylactic measures for fliers and parachutists. (43 references, chiefly from Soviet sources)

7800

Salazar, A.,

and C. P. Phoebus

AERONAUTICAL PREVENTIVE MEDICINE IN THE U. S. NAVY.—In: Aeronautical preventive medicine, p. 11-19. North Atlantic Treaty Organization, Advisory Group for Aeronautical Research and Development. AGARDograph no. 36, Nov. 1957. AD 233 126 UNCLASSIFIED

Many new health problems have been found in personnel working in naval air stations and on aircraft carriers as a result of exposure to aircraft noise during testing engines or repair operations; toxic new fuels, paints, hydraulic fluids, etc.; microwave or radar radiations; heat; ultraviolet rays, and other forms of physical energy. In order to protect this

personnel medical and safety services are provided which concern themselves with preventing occupational diseases and personal accidents. Industrial hygienists and health maintenance teams are added to the bases to conduct periodic inquiries on work conditions and institute protective health measures. The flight surgeon is responsible for maintaining medical control and surveillance of flying personnel, and also serves in technical consultations, in aeronautical research laboratories, and in health training activities.

7801

Samaha, F. J.

PREVENTIVE DENTISTRY IN THE U. S. AIR FORCE.—U. S. Armed Forces Med. Jour., 8 (5): 708-712. May 1957. DLC (RC970.U7, v. 8)

The plan designed by the dental service of the U. S. Air Force (Section G, AFM 160-13) was evaluated at the U. S. Air Force Hospital, Bergstrom A. F. Base, Texas, for 1955 and 1956. In comparison with the dental health status of the U. S. Air Force for 1952, the effects of the plan were to decrease by 30% the need for dental treatment and to decrease the number of cavities, extractions, and the number of periodontal cases. The use of fluoridation of drinking water on military bases is discussed.

7802

Stubbs, R. A.

SPECIFIC AEROMEDICAL PROBLEMS IN HIGH PERFORMANCE AIRCRAFT.—Canad. Aeronaut. Jour. (Ottawa), 3 (7): 216-219. Sept. 1957. DLC (TL501.C2713, v. 3)

Aeromedical problems are considered as they arise from the effects of altitude, air speed, and their combination during flight in a high-performance aircraft. Pressure-breathing devices at various altitudes, cabin temperature regulation at different speeds, and escape methods at several combinations of altitude and speed are discussed. The aeromedical problems associated with the operation of a high-performance aircraft cannot be appreciated or solved by any one organization or scientific discipline, but require a frank interchange of knowledge and techniques between all disciplines and cooperation with many organizations.

7803

Van Liere, E. J.

SPACE MEDICINE.—West Virginia Med. Jour., 53 (8): 297-301. Aug. 1957. DNLM

An outline is made of some of the physiologic problems encountered in space flight, including those arising from accelerations, weightlessness, rapid decompression, and hypoxia. As a result of such flights physicians will have to treat such things as radiation sickness, ultraviolet and thermal burns, cosmic ray damage, sterility, accidents due to meteors, and fractures sustained by assuming incorrect position when acceleration begins. Mention is made of the emotional strain and physical and mental fatigue which are conducive to bringing about neuroses in spacemen.

7804

Webb, H. B.

AEROMEDICAL PROBLEMS IN LOGISTIC AIR OPERATIONS IN LATIN AMERICA.—Jour. Aviation Med., 28 (4): 401-405. Aug. 1957. DLC (RC1050.A36, v. 28)

The problems of the Caribbean Air Command which flies C-47 and C-54 aircraft throughout South America presents many aeromedical problems far removed from the space and jet age. High-altitude operations between various cities produce problems in mountain sickness, oxygen system failure, and fatigue. Equipment of World War II design causes problems in sanitation, feeding of passengers, ventilation and heating. The flight support systems are relatively poor in these areas and affect crew efficiency, and scheduling of long continuous flights often causes overwork and fatigue. Medical aspects of hepatitis and gastrointestinal disturbances and their effect on personnel are discussed. The role of the flight surgeon in relation to the aircrews and their families is commented upon.

7805

Wilson, J. S.

THE PRESERVATION OF HEALTH AND EFFICIENCY.—In: Aeronautical preventive medicine, p. 29-37. North Atlantic Treaty Organization, Advisory Group for Aeronautical Research and Development. AGARDograph no. 36, Nov. 1957. AD 233 126 UNCLASSIFIED

Many stresses, both psychological and physical, are placed upon ground personnel during air operations. When these continue for some time they may produce deterioration in the individual's health, insufficient to keep him from duty but sufficient to deteriorate task performance. Physical stress may be associated with unsuitable environmental conditions such as excessively high or low temperatures and humidity, excessive noise, or insufficient illumination. Noise attenuation measures such as ear muffs, double window glass, and wall linings, etc., are outlined. Psychological stress includes the monotony or the complexity of the task at hand, with overwork, or even lack of work. It is the object of preventive medical practitioners to determine where impairment of efficiency, morale, and health occurs and to institute preventive measures for them.

7806

Wulfften Palthe, P. M. van

[LIPOTHYMIA] Lipothymie.—Aeromedica acta (Soesterberg, Netherlands), 5: 281-295. 1956/57. In French, with English summary (p. 295). DNLM

Causes of lipothymia (fainting) were analyzed in 71 cases of pilot-candidates and pilots. In addition to the routine aeromedical examination the following tests were performed: orthostatic tolerance test; pulse-blood pressure diagram; cold-pressor test; electroencephalograph tracings simultaneously with electrocardiogram before and after glucose stress, hyperventilation, and photic stimulation; psychological interview; and stipple test. Four main types of lipothymia were differentiated: orthostatic, vaso-vagal, emotional, and of epileptiform origin. Emotional hyperventilation and hypoglycemia are rarely among causes of fainting. The tendency in emotional crisis is to react either with the "totstell" reflex (akinesia with mutism) or with psychomotor hyperactivity. There is no indication that fainters are more prone to either mode of reaction. Fainting per se without pathology is not to be regarded as a reason for rejection. No accidents due to a human factor were uncovered in the flying careers of lipothymics.

b. Sicknesses

[Motion sickness drugs under 8-d]

7807

Bardales V., A.

[ACUTE PULMONARY EDEMA CAUSED BY SEVERE MOUNTAIN SICKNESS] Edema pulmonar agudo por soroche grave.—Revista peruana de cardiología (Lima), 6 (2): 115-139. May-Aug. 1957. In Spanish. DNLM

Twelve cases are reported of acute pulmonary edema caused by severe mountain sickness which occurred in natives and persons living at high altitude. These cases are subdivided into two groups: group A (children with severe tachycardia, hypotension, embryocardiac rhythm, and near-physical collapse), and group B (adults with less accentuated tachycardia, normal blood pressure, and better body status). Consideration is also given to the x-ray pathology, electrocardiographic aspects, therapy, pathogenesis, and complications of these cases.

7808

[Bergin, K. G.]

PREVENTION AND TREATMENT OF AIR SICKNESS.—Practitioner (London), 178 (1067): 626-628. May 1957. DNLM

Factors playing a part in the etiology of airsickness are either vestibular, partly psychological, or, in part, located in the cerebellar cortex. Preventive measures are based on (1) personal aspects, such as preparing psychologically for the flight, or using a mild sedation or one of the approved tranquilizing agents in an effort to reduce preflight tension; (2) flying conditions, seating susceptible subjects near the longitudinal center of the aircraft; and (3) dietary aspects, avoiding overeating, particularly fatty foods, before and during flight. Complete abstinence from food is not recommended. Hyoscine is the drug of choice where drug therapy of airsickness is indicated.

7809

Curvaille, J.,

P. Robert, and P. Burgeat
[TOOTHACHE OF THE AVIATOR (87 CASE REPORTS OF AERODONTALGIA)] Les douleurs dentaires de l'aviateur (à propos de 87 observations d'aérodontalgies).—Médecine aéronautique (Paris), 12 (3): 249-257. 1957. In French, with English summary (p. 257). DLC (TL555.M394, v. 12)

A statistical survey of 2250 flying personnel revealed 87 cases of aerodontalgia (3.5% in civilian aircrews, and 7.2% in military aircrews). Take-off speed and pressurization are the common causes, but the principal factor is altitude, whether real or simulated. Above 2,000 meters incidents of aerodontalgia increase in frequency. Pain may become so intense as to render flight performance impossible. Aerodontalgia is classified as to: (1) barotraumatic origin, (2) the nature and quality of dental fillings, (3) peridental infection, (4) cold exposure, (5) false aerodontalgia (a phenomenon which is primary or secondary to another related disorder), and (6) exceptional or undetermined cause. Prevention hinges upon proper hygiene of the mouth. Most aviators tend to ignore the dangers of tooth infection; therefore, it is the duty of the physician and dentist to detect signs of aerodontalgia and to require periodic dental examination of all flying personnel.

7810

Doeschate, G. ten

[THE HISTORY OF MOUNTAIN SICKNESS] De geschiedenis van de bergziekte.—Nederlands tijdschrift voor Geneeskunde (Amsterdam), 101 (42): 1966-1967. Oct. 19, 1957. In Dutch. DNLM

Historical reports on the occurrence and symptoms of "mountain sickness" are reviewed up to the beginning of low-pressure chamber research.

7811

Herrligkoffer, K. M.

[MAN AT HIGH ALTITUDES] Der Mensch in grossen Höhen.—Naturwissenschaftliche Rundschau (Stuttgart), 10 (2): 56-59. Feb. 1957. In German.

DLC (Q3.N823, v. 10)

Mountain sickness is reviewed with respect to its etiology, contributing factors, and its manifestations in mountain climbers. The direct cause is the lowered atmospheric pressure and the resulting oxygen lack. Symptoms of this change in biological environment are anoxia, Cheyne-Stokes respiration, alkalosis, reduction of all body functions, a fall in the muscle tone, and lowered subjective well-being culminating in apathy and altitude rage. Subjective complaints include headache, nausea, vomiting, and diarrhea, pointing to autonomic hyperstimulation brought about by incipient metabolic disturbances of the central nervous system. These nervous symptoms are without doubt increased by the lowered atmospheric pressure. Sympathomimetic and analeptic agents such as Pervitin (d-1-phenyl-2-methylamino-propane hydrochloride) have proved to be beneficial in mountain climbing by raising the heart minute volume, blood pressure, pulmonary ventilation, and mental efficiency.

7812

Howlett, J. G.

MOTION SICKNESS.—Canad. Med. Assoc. Jour. (Toronto), 76 (10): 871-873. May 15, 1957. DNLM

Different types of motion sickness are reviewed with the suggestion that susceptibility may be specific to the type of motion. Although adaptation usually occurs, it will not protect against another type of motion. The mechanism for production of motion sickness seems to be a central nervous system response to linear acceleration stimulating the utricle or to angular acceleration stimulating the semicircular canals. Evidence from ablation studies in dogs indicates that the uvula and nodulus of the cerebellum are concerned in the genesis of motion sickness. Treatment is largely prophylactic by means of Benadryl, Dramamine, Phenergan, Artane (benzhexol), hyoscine hydrobromide, or Mosidol (thiobarbituric acid compound).

7813

Laboureur, P.

[AIRSICKNESS, PSYCHOSOMATIC SYMPTOM] Mal de l'air, symptôme psychosomatique.—Revue de médecine navale (Paris), 12 (2): 117-120. 1957. In French. DNLM

Three cases (in two pilots and one flight mechanic) are reported of airsickness related to operational fatigue. The airsickness was perfectly manifest clinically, but did not display a consistent symptom. Psychic origin was evident since these patients never displayed this disorder during their active flight careers.

7814

Marbarger, J. P.,

W. Kadetz, D. Variakojis, and J. Hansen
THE OCCURRENCE OF DEPRESSION SICKNESS FOLLOWING DENITROGENATION AT GROUND LEVEL.—Jour. Aviation Med., 28 (2): 127-133. April 1957. DLC (RC1050.A36, v. 28)

Nitrogen elimination by oxygen breathing was studied in 33 healthy male subjects (av. age 23.2 years) with denitrogenation accomplished at ground levels and at simulated altitudes up to 38,000 ft. Rate and volume of tissue nitrogen elimination, total oxygen inhaled, and total air exhaled were recorded for the various altitudes. The number of subjects developing the bends was determined for the various altitudes during a 2-hour period of exposure. The lowest percentage of cases (6.1%) was reported for exposure to 38,000 ft. altitude after denitrogenation at ground level or at 8,000 ft., and the highest percentage (48.5%) for exposure to 38,000 ft. without previous denitrogenation. (Authors' summary, modified)

7815

Marbarger, J. P.,

W. E. Kemp, W. Kadetz, D. Variakojis, and J. Hansen

STUDIES IN AEROEMBOLISM.—Univ. of Illinois. Aeromedical and Physical Environment Lab., Chicago; issued by School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 57-44, Feb. 1957. 11 p. UNCLASSIFIED

The incidence of decompression sickness was studied in 15 male subjects during a total of 75 flights to simulated altitude of 38,000 feet with standard exercise for a period of 30 minutes. In 30 of these experiments in which direct ascent was accomplished to 38,000 feet from ground level all of the subjects developed decompression sickness in less than one-half hour. The 45 remaining experiments were divided into three parts: (1) subjects remained at 18,000 feet for 4 hours breathing ambient air with oxygen added so that partial pressure of oxygen was 105 mm. Hg; (2) subjects remained at 18,000 feet breathing 100 percent oxygen for 2 hours; and (3) subjects remained at 12,000 feet for 4 hours breathing ambient air. Following this denitrogenation procedure, 8, 6, and 8 subjects, respectively, remained at 38,000 feet without developing "bends". Blood nitrogen content and respiratory studies are included in this report.

7816

Navarranne, P.

[SEASICKNESS] Le mal de mer.—Revue de médecine navale (Paris), 12 (2): 105-116. 1957. In French. DNLM

This is a review of the literature on seasickness from the standpoint of its etiology, clinical manifestations, pathogenesis, and prevention. Effective treatment is obtained by means of drugs such as nervous system depressors (barbiturates, bromides, chloral), parasympatholytics, central antisynaptics (antihistaminics, Dramamine, Nautamine), chlorpromazine, vitamin B₆ suppositories, and various other drug combinations. (30 references)

7817

[OBESE PILOTS OF THE USAF] Les pilotes obèses de l'USAF.—Force aérienne, Service de santé,

AEROSPACE MEDICINE BIBLIOGRAPHY 1957

Bulletin technique d'information [Bruxelles], 1957
(Aug): 28. In French. DNLN

A brief discussion is presented of an air force memorandum requesting obese pilots to reduce. Two fatal cases of obese pilots are reported following flight at 9000 meters. Obese subjects are especially susceptible to aeroembolism and to the pulmonary form of chokes. It is postulated that adipose tissue retains much liquid nitrogen which is liberated to the gaseous state at altitudes higher than 8000 meters, and since adipose tissue is extremely vascular, nitrogen bubbles remain in place and induce localized pain, or bends.

7818

Powell, T. J.,

T. M. Carey, H. P. Brent, and W. J. R. Taylor
EPISODES OF UNCONSCIOUSNESS IN PILOTS
DURING FLIGHT IN 1956.—*Jour. Aviation Med.*,
28 (4): 374-386. August 1957.

DLC (RC1050.A36, v. 28)

Eight cases of unconsciousness or diminished consciousness while flying were investigated at the Institute of Aviation Medicine in Toronto during 1956. Five of these cases satisfied the criteria for the diagnosis of "physiologic unconsciousness in medically fit aircrew." The factors seem to be: (1) previous or concomitant g; (2) hypoglycemia occurring a few hours after a light carbohydrate meal; and (3) hyperventilation. Anxiety or anger, and early slow electroencephalogram activity with hyperventilation seem to be associated factors. All these findings contribute to diminished cerebral activity and can summate. It is considered that this summation is the cause of the unconscious episodes, and therefore these episodes may be prevented by removing one or more of the factors. (Authors' summary)

7819

Schneck, S. A.

DECOMPRESSION SICKNESS AT MEDIUM ALTITUDE.—*U. S. Armed Forces Med. Jour.*, 8 (9): 1366-1370. Sept. 1957. DLC (RC970.U7, v. 8)

A case report of what is believed to be the lowest reported altitude for decompression sickness is given. When the pilots ascended to 45,000 feet (cabin pressure equivalent to 24,400 feet) within 45 minutes, one individual developed symptoms of dysbarism with involvement of the central nervous system. The symptoms and treatment are discussed in detail.

7820

Taylor, N. B. G.,

J. Hunter, and W. H. Johnson
ANTI-DIURESES AS A MEASUREMENT OF LABORATORY INDUCED MOTION SICKNESS. — *Canad. Jour. Biochem. and Physiol. (Ottawa)*, 35 (11): 1017-1027. Nov. 1957. DLC (R11.C37, v. 35)

Eighty-one human subjects and two bitches have been exposed to accelerations on a turntable or a swing for the purpose of inducing motion sickness. An inhibition of water diuresis consistently accompanied laboratory-induced motion sickness. Subjects who failed to become motion sick exhibited a much smaller inhibition of diuresis or none at all. The inhibition of diuresis is related to the motion sickness itself and is not due to the direct effects of centrifugal and rotational forces on the circulation. (Authors' abstract)

7821

Wang, S. C.,

H. I. Chinn, and A. A. Renai

EXPERIMENTAL MOTION SICKNESS IN DOGS:
ROLE OF ABDOMINAL VISCERAL AFFERENTS.—
School of Aviation Medicine, Randolph Air Force
Base, Tex. Report no. 57-112, June 1957. 4 p.

UNCLASSIFIED

Also published in: *Amer. Jour. Physiol.*, 190 (3): 578-580. Sept. 1957. DLC (QP1.A5, v. 190)

Motion sickness was experimentally induced in dogs by means of a standardized swinging procedure. Subsequently, 21 susceptible dogs were chosen in this series for abdominal sympathectomy and/or abdominal vagotomy. Over a period of about six months, these operated animals were retested several times, and it was found that the majority of them (67%) showed increased resistance to swing sickness to a greater or lesser degree. However, because of the relatively high percentage of the remaining dogs which showed no alteration of their swing sensitivity, it is concluded that the visceral afferents from the gastrointestinal tract play no paramount role in experimental motion sickness. Nevertheless, it is suggested that visceral nerves and other afferent pathways are important in affecting or perhaps in maintaining the excitability of the vomiting center. (Authors' abstract)

7822

Wit, G. de

ACQUIRED SENSITIVITY TO SEASICKNESS AFTER AN INFLUENZA INFECTION.—*Practica oto-rhinolaryngologica (Basel)*, 19 (6): 579-586. Nov. 1957. In English. DNLN

Three cases of sensitivity to seasickness which had developed after an influenza infection are described. These patients previously resistant to seasickness, had probably suffered a very mild influenza-brain stem encephalitis. In addition to formerly sustained deficiencies (PP factor) and cranial trauma, influenza may also be a cause for increased sensitivity to seasickness. (Author's summary, modified)

7823

Wit, G. de

SOME ANIMAL EXPERIMENTS ON MOTION SICKNESS.—*Acta oto-laryngologica (Stockholm)*, 48 (1-2): 172-181. July-Aug. 1957. In English. DNLN

Five dogs were subjected to vestibular stimulation in an apparatus employing linear acceleration in a vertical direction. All animals became motion-sick within twenty minutes. Bilateral local procaine injections in the cervical sympathetic ganglia postponed the onset of motion sickness (vomiting). Elimination of the sympathetic system was shown to diminish susceptibility to motion sickness. The protection though is not an absolute one, since overstimulation of other sense organs also enhances the acetylcholine production and thus vagal stimulation.

7824

Wünsche, O.

[THE PATHOGENESIS AND PROPHYLAXIS OF DECOMPRESSION SICKNESS OF THE HIGH ALTITUDE FLIER. I. ON THE EFFECT OF HYALURONIDASE ON THE LENGTH OF PRELIMINARY OXYGEN BREATHING] Zur Pathogenese und Prophylaxe der Druckfallkrankheit des Höhenfliegers. I. Über den Einfluss der Hyaluronidase auf die Dauer der Sauerstoff-Voratmung.—*Internationale Zeitschrift*

für angewandte Physiologie (Berlin), 16 (6): 453-463. 1957. In German. DNLM

In comparative experiments with a large number of rats, the author succeeded in shortening the effective length of preliminary oxygen prophylaxis by use of the enzyme hyaluronidase. The effective duration of O₂ pre-breathing had been determined in preliminary experiments. (Author's summary, modified)

c. Diseases and Injuries

[Mental diseases under 5-d]

7825

Alekseev, A. P.
[ANALYSIS OF INJURIES RESULTING FROM PARACHUTING] K analizu parashutnogo travmatizma. — Voenno-meditsinskii zhurnal (Moskva), 1957 (2): 76-77. Feb. 1957. In Russian.

DLC (RC970.V55, v. 1957)

Of the parachuting injuries analyzed 93% occurred on the ground, the remaining 7% during the opening of parachute. The injuries were much higher during night jumps (6.34%) than during day jumps (0.19%). It is claimed that inadequate training is the principal factor in the occurrence of these accidents. 87% of all the injuries were to the lower extremities. 7% were fractures and injuries of other parts of the body. Vertebral fractures occurred while landing on hard ground with extended feet or upon the buttocks. Adequate training is required to prevent such accidents.

7826

Aulong, J.
[A RARE ACCIDENT FROM PARACHUTE JUMPING: PERFORATION OF THE SMALL INTESTINE UPON LANDING] Un accident rare du parachutisme: perforation du grêle à l'atterrissage. — Société de médecine militaire française (Paris), Bulletin mensuel, 51 (3): 230-231. May 1957. In French. DNLM

During an exercise in parachute jumping, one individual landed awkwardly on his back and soon afterwards experienced violent abdominal pain. X-ray examination revealed no spinal fracture. Exploratory surgery showed a small perforation of the 2nd loop of the small intestine, which was repaired. Additional x-ray exhibited a calcified ganglion on the left side of L3, which was also removed. This is a case of intestinal perforation caused by contusion of the calcified ganglion. Etiological hypotheses are discussed in relation to the jump.

7827

Barron, C. I.
AUDIOMETRIC STUDIES OF FLIGHT LINE MECHANICS. — Jour. Aviation Med., 28 (2): 295-302. June 1957. DLC (RC1050.A36, v. 28)

Serial audiometric studies of 470 flight line mechanics exposed to reciprocating and turbojet engine noise for periods up to seven years are reported. Daily exposure of this group to high-energy noise was limited to a few minutes daily. There were no significant changes in the mean of median threshold tests for the group at 1,000 or 4,000 c.p.s. frequencies other than those generally associated with presbycusis, and no auditory nerve damage or hearing loss of a significant degree could be demonstrated. Individual threshold changes revealed only six cases of elevations in excess of 20 db. at 4,000 c.p.s. with

a maximum loss of 45 db. These changes appeared to be unrelated to the use of ear protection. The need for a closely supervised hearing conservation program with careful observation of flight line personnel is emphasized. A graph showing the spectral distribution of typical noise levels of a turbojet engine is included. (Author's summary, modified)

7828

Beischer, D. E.
A PILOT STUDY OF SERUM LIPOPROTEINS IN NAVAL AVIATION CADETS. — Naval School of Aviation Medicine, Pensacola, Fla. (Project no. NM 18 03 11, Subtask 3). Report no. 8, June 15, 1957. ii+6 p. AD 144 100 UNCLASSIFIED

Three per cent of a group of 375 naval aviation cadets had unusually high values of the serum lipoprotein concentration determined by the ultracentrifuge method. Following Gofman's reasoning, the relative likelihood of developing coronary disease in later life would be greater for these men than for the rest of the group. Preventive measures in the form of dietary regimens are recommended in these cases. (Author's abstract)

7829

Bernstein, S. H.
EFFECTS OF HOUSING ON INCIDENCE AND SPREAD OF COMMON RESPIRATORY DISEASES AMONG AIR FORCE RECRUITS. — School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 57-81, June 1957. 9 p. AD 142 529 PB 130 075

Two types of barracks housing for Air Force recruits were compared with regard to the incidence and spread of group A beta-hemolytic streptococcal infections, influenza, and undifferentiated viral respiratory diseases. Except for men arriving in November, December, and January, the two types of barracks construction considered (open bay and closed bay barracks) appeared to have little influence on the rate of hospital admissions for any of the respiratory diseases studied. No association was apparent between the incidence of these diseases and the number of men per barracks or region of the country in which the men enlisted. The seasonal incidence of these diseases conformed to the expected patterns. (From the author's abstract)

7830

Brasilense, H. A. Q.
[STOMATOLOGICAL PROBLEMS RELATED TO AVIATION] Problemas estomatológicos relacionados com a aviação. — Revista médica da aeronáutica (Rio de Janeiro), 9 (1-2): 87-99. Jan.-June 1957. In Portuguese, with English summary (p. 98).

Four cases are reported of dental pulp and peripheral changes in pilots which occurred during flight due to emotional factors (stress) and high altitude. Aviation dentistry is considered as related to the environmental factors (atmospheric pressure and temperature changes, radiations, illumination, electricity, centrifugal force) affecting pilots during flight. The problems of aerodontalgia and aerostomatitis, and the requirement of perfect temporomandibular articulation for pilots in order to prevent injuries are discussed.

7831

Calatrava Paramo, L.
[AERODONTALGIA] Aerodontalgia. — Revista de aeronáutica (Madrid), 17 (205): 962-964. Dec. 1957. In Spanish. DLC (TL504.R516, v. 17)

The etiopathogenesis of aerodontalgia is related to two factors: (1) predisposing factors, such as the metallic fillings in teeth with pulpal lesions; and (2) environmental factors, such as reduced barometric pressure during flight at altitude or in a decompression chamber. Aerodontalgia may be caused by anoxia, either local, anoxic, or histotoxic. Cold is also a causative factor as it affects metal dental fillings and causes vasoconstriction of the dental circulation. Preventive measures include proper dental hygiene and periodic dental examination of flying personnel.

7832

De Cilla, F.

[CORONARY THROMBOSIS IN FLIGHT] Trombosi coronarica in volo.—*Rivista di medicina aeronautica* (Roma), 20 (4): 689-692. Oct.-Dec. 1957. In Italian, with English summary (p. 691).

DLC (RC1050.R56, v. 20)

A case is reported of coronary thrombosis which occurred in a 45-year-old pilot during flight. Consideration is also given to the medico-legal aspects of the case. Pilots, regardless of youth, having suffered serious cardiac infarct must be exempt from flight duty and flight training. In more favorable cases, permission for training may be granted on the condition that another pilot is on board. It is recommended that provisions be made to reduce and regulate the flight activity of pilots over 50 years of age.

7833

De Cilla, F.,

and P. Italiano

[SOME CONSIDERATIONS CONCERNING SPINAL INJURIES CAUSED BY FLIGHT ACCIDENTS] Alcune considerazioni sulle lesioni traumatiche vertebrali da incidente di volo.—*Rivista di medicina aeronautica* (Roma), 20 (2): 262-268. April-June 1957. In Italian, with English summary (p. 268).

DLC (RC1050.R56, v. 20)

Four cases are reported of spinal lesions in pilots which occurred during ejection-seat bailout, or during emergency landing. Since these lesions have a poor symptomatology, it is necessary to x-ray the lumbar portion of the spinal column, especially the dorso-lumbar tract (accounting for three fourths of all spinal injuries), of all pilots involved in all types of flight accidents.

7834

Gavrilko, N. M.,

and G. L. Erlikh

[CAUSES OF VESTIBULAR-VEGETATIVE DISTURBANCES IN FLYING PERSONNEL] O prichinakh vozniknoveniya vestibulo-vegetativnykh rasstroystv i letnogo sostava [Abstract]. — *Voenno-meditsinskii zhurnal* (Moskva), 1957 (7): 80-81. July 1957. In Russian.

DLC (RC970.V55, v. 1957)

Vestibulo-autonomic disturbances observed in a few fliers were shown to be caused by intestinal and biliary lambliaias. The disturbances (vertigo, vomiting, and nausea) became so severe that they made further flights impossible. In rotation tests the autonomic reflexes were exaggerated and manifested themselves in respiration, tachycardia, nausea, vomiting, and paleness. A course of treatment with acricquine cured lambliaias and abolished the vestibular disturbances.

7835

Gibert, A. P.,

J. Colin, and P. M. Chikhan

[AERODONTALGIA] Les aërodontalgies.—*Médecine aéronautique* (Paris), 12 (3): 233-248. 1957. In French, with English summary (p. 247).

DLC (TL555.M394, v. 12)

Aerodontalgia is a relatively frequent occurrence during flight. It is manifest during ascent and appears when existing dental or para-dental lesions exist. Among the numerous pathogenic theories those based on gas expansion, aeroembolism, and tissue anoxia or congestion are most acceptable. Positive diagnosis may be made by examination of the mouth and teeth, and by radiographic examination. Mention is made of differential and etiological diagnosis. Treatment is essentially preventive during and after selection of the aircrew. Therapeutic measures are discussed.

7836

Gol'din, N. A.

[BIOELECTRIC CEREBRAL POTENTIALS IN PERSONS WITH REMOTE SEQUELAE OF CLOSED CEREBRAL TRAUMA IN CONDITIONS OF HYPOXIA] Bioelektricheskie potentsialy mozga u lits s ot-dalennymi posledstviyami zakrytoi cherepno-mozgo-voi travmy v usloviakh gipoksii. — *Voenno-meditsinskii zhurnal* (Moskva), 1957 (9): 17-23. Sept. 1957. In Russian.

DLC (RC970.V55, v. 1957)

Bioelectric cerebral potentials were recorded in 200 fliers with past histories of cerebral trauma, and in 20 fliers as controls. The biopotentials at normal atmospheric pressure differed little among the two groups. This presented diagnostic problems in persons suffering from post-traumatic epilepsy. The use of artificial hypoxia revealed in 8 cases epileptic bioelectric activity characterized by arrhythmia. The application of controlled hypoxia during electroencephalography permits, therefore, a better diagnosis of pathological conditions in patients with past cerebral injuries that cannot be detected in normal conditions.

7837

GUIDE FOR CONSERVATION OF HEARING IN

NOISE.—*Noise Control*, 3 (3): 23-31. May 1957.

DLC (TA365.N6, v. 3)

Prolonged exposure to the noises encountered in many industrial environments can produce permanent hearing loss which is not amenable to treatment. The purpose of this guide is to assist members of the industrial community in their efforts to protect hearing. Information is included on how to determine whether a noise exposure calls for hearing conservation and, if it does, how to organize, conduct, and monitor a practical hearing conservation program. Noise exposure may be controlled by one or more of the following methods: (1) reduction in amount of noise produced by the source, (2) reduction in amount of noise transmitted through air or building structures, (3) revision of operational procedures (rotate personnel, change job schedules), (4) use of personal protection (ear plugs, ear muffs) and indoctrination of personnel on the hazards of noise exposure. Both preplacement and periodic follow-up hearing tests are part of the program routine.

7838

Hamburger, R. J.,

and G. J. Puister

[VASCULAR DISEASE AND THE COURSE OF THE

OXIDATION-REDUCTION POTENTIAL IN THE SALIVA Vantaandoeningen en het verloop van oxydo-reductie potentialen in het speeksel.—*Aeromedica acta* (Soesterberg, Netherlands), 5: 403-411. "1956/57". In Dutch, with English summary (p. 410-411). DNLN

Certain peculiarities in the oxidation-reduction potential have been detected in the saliva 4-15 minutes after collection from patients with coronary infarction and from children with a hereditary background of vascular disease. The oxidation-reduction potential of the saliva was measured in three groups of healthy men in search for changes indicative of proneness to degenerative vascular disease. A marked difference in the potential during the first five minutes was uncovered between the three age groups, 20-30 years, 30-40 years, and 40-50 years, respectively. The rate of change amounted to 18 and 19 millivolts in the two younger groups, but increased to 52 millivolts in the older group. No differences were seen after the first five minutes had elapsed. These results support the hypothesis that the change in the oxidation-reduction potential of the saliva as a function of the time elapsed, may be associated with the same metabolic processes which operate in vascular degeneration.

7839

Iriarte, D. R.

[BAROTITIS, BAROSINUSITIS, AND TRAUMATIC PERFORATION OF THE TYMPANUM] Barotitis, barosinusitis y perforaciones traumáticas del tímpano.—*Ciencia aeronáutica* (Caracas), 3 (33): 17. Aug. 1957. In Spanish. DLC-Per

Aerotitis media (barotitis media) is an acute inflammation of the middle ear caused by pressure differences between the middle ear and the external auditory canal. The main symptoms are hearing loss, sensations of water-in-the-ears, and noise. Treatment consists of the application of nasal decongestants and tubal insufflation. Barosinusitis presents symptoms similar to aerotitis media and causes great pain in the sinuses of the pilot flying at altitude during descent. Nasal decongestant therapy is also useful for this condition. Traumatic perforation of the tympanum may occur in pilots during rapid descent and in combination with throat and nose infections. Treatment with trichloroacetic acid solution is suggested, with audiometric control.

7840

Ivlev, N. S.

[CONTRAINDICATIONS FOR TRAINING IN PARACHUTE JUMPING AND CATAPULTING] K voprosu o protivopokazaniyakh k uchebnotrenirovochnym parashlyutnym pryzhkam i katapul'tirovaniyu.—*Voenno-meditsinskii zhurnal* (Moskva), 1957 (4): 49-51. April 1957. In Russian.

DLC (RC970.V55, v. 1957)

Case histories concerning hospital treatment of personnel from a flying command in 1954-55 were analyzed. The objective was to screen individuals for further parachute jumping and catapulting training. Individuals with a history of traumatic injuries sustained during such trainings (fractures of the vertebral column, luxations of the arms) were capable of further flight duty but further jump practices and catapulting was not advisable. Cases of mild thrombosis and obesity were also excluded from this training.

7841

Koch, C.

[AUDIOMETRIC STUDIES IN AVIATION PERSONNEL WITH CRANIAL INJURIES: PRELIMINARY NOTE] Indagini audiometriche nei traumatizzati cranici in aviazione. Nota preventiva.—*Rivista di medicina aeronautica* (Roma), 20 (3): 455-461. July-Sept. 1957. In Italian, with English summary (p. 460).

DLC (RC1050.R56, v. 20)

An approach is presented to the audiometric evaluation of hearing following cranial injury. This evaluation permits, for medico-legal purposes, a distinction between lesions prior to injury and lesions directly caused by it. The problem presents many difficulties due to the scarcity of cases. Included are audiograms from 2 cases of cranial injuries occurring in pilots involved in flight accidents.

7842

Kopra, L. L.,

C. Bridges, and M. Siegelman

HEARING ACUITY OF AIR FORCE FLIGHT-LINE PERSONNEL: A PRELIMINARY REPORT.—Univ. of Texas, Austin; issued by School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 57-73, July 1957. 13 p. AD 145 384 UNCLASSIFIED
Also published as: L. L. Kopra, **HEARING LOSS AMONG AIR FORCE FLIGHTLINE PERSONNEL.**—*Jour. Acoust. Soc. Amer.*, 29 (12): 1277-1283. Dec. 1957. DLC (QC221.A4, v. 29)

Pure-tone audiometric tests and job-, noise-, and medical-history questionnaires were administered to 996 flight-line personnel. For 16 air force specialty groups mean hearing losses (worse and better ear) at 4000 c.p.s. ranged from 1.8 to 20.7 decibels re audiometer zero. Significant positive correlation was found when 4000-c.p.s. hearing loss was correlated with age and with length of noise exposure. However, when the positive hearing loss versus exposure correlation was adjusted for the positive relationship between age and exposure, no remaining statistically significant relationship existed between 4000-c.p.s. hearing loss and length of noise exposure. Infrequent use of ear protection is interpreted as evidence indicating a real need for effective noise and ear-protection indoctrination of personnel exposed to high-level on-the-job noise. (Authors' abstract)

7843

Kostelijk, P. J.,

and H. Stigter

[FIGHT AGAINST ACOUSTIC TRAUMA IN THE MILITARY FORCES] De bestrijding van het accoustisch trauma bij de strijdkrachten.—*Nederlands militair geneeskundig tijdschrift* ('s-Gravenhage), 10 (7): 190-200. July 1957. In Dutch.

DLC (RC971.N4, v. 10)

Permanent acoustic trauma has been shown to result not only from continuous exposure to noise, but also from short exposures to intense noise, e.g., explosions. Audiometric investigation of the hearing in ground personnel working with propeller aircraft revealed a hearing loss of more than 25 db. in one or more of the frequencies within the 1000-6000 c.p.s. range in 18-19% of the workers. Research on permissible noise level showed a close correlation between intensity, frequencies, duration of exposure, and individual susceptibility. In places where the noise exceeds permissible levels, either of several measures have been employed: (1) technical improvements to lessen noise, (2) periodic

audiograms, and (3) various types of ear defenders. Different types of ear props, ear muffs, and helmets used by the military are evaluated with respect to the amount of protection they afford.

7844

Langraf, F.,

and R. Jucker

[ON THE IMPORTANCE OF FOCAL DISEASE IN AVIATION MEDICINE] Sur l'importance de la maladie focale en médecine aéronautique.—In: The first European congress of aviation medicine, p. 125-128. *Aeromedica acta* (Soesterberg, Netherlands), Special edition, 1957. In French. DNLM

Young pilots below 36 years of age and in good health were subjected to a thorough medical examination. 60 pilots showed signs of focal disease sufficient to necessitate elimination of the focus (tonsils, teeth, appendix, sinuses). Symptoms by which the focal infections were suspected were principally micro-hematurias, symptoms of nephritic foci, rheumatic pains, electrocardiographic alterations, and extrasystoles. In 34 of the 60 cases treated the secondary disease disappeared after treatment. Systematic research of focal infections, generally in the tonsils and teeth, during the control examination of flying personnel, permits the etiological diagnosis of a certain number of clinically latent or insidiously developing disorders.

7845

Lapras, A.

[ABDOMINAL SURGERY AT ALTITUDE: APPENDICECTOMY AT 4,700 m.] Chirurgie abdominale en altitude: appendicectomie à 4.700 m.—*Presse médicale* (Paris), 65 (61): 1399-1400. Aug. 17, 1957. In French. DNLM

This is the first reported case of appendicitis in a Sherpa guide from Nepal which necessitated immediate surgery at an altitude of 4,700 m., during the last stages of a Himalayan expedition to Makalu in 1955. Surgery was successfully performed, but the patient's postoperative course was dominated by anoxia (15 bottles of oxygen were used and responsible for saving his life) and the hazards of the cold environment (constant fires were required for heat). Successful recovery is attributed to (1) adequate medicine and equipment carried on the expedition; (2) perfect group unity; (3) the degree of acclimatization attained towards the end of the expedition (if the operation had been called for at the beginning of the stay at altitude, at the time when the group was not yet acclimated, major difficulties would have been encountered); (4) adequate reserves of oxygen; and (5) the physical resistance which was especially well developed in the young Sherpa.

7846

Lavernhe, J.

[NEUROVEGETATIVE MANIFESTATIONS OF CHRONIC INTESTINAL AMEBIASIS: THEIR SIGNIFICANCE IN AVIATION MEDICINE] Les manifestations neuro-végétatives de l'amibiase intestinale chronique: leur intérêt en médecine aéronautique.—*Médecine aéronautique* (Paris), 12 (2): 167-173. 1957. In French, with English summary (p. 172-173). DLC (TL555.M394, v. 12)

Chronic intestinal amebiasis causes morbid manifestations (cardiovascular, neuropsychic, and gastrointestinal). These are of great importance to flying personnel where neurovegetative stability is essen-

tial to task performance. Diagnosis by means of simulated flight in a decompression chamber is discussed, but confirmation of the disease is possible only by isolation of the dysentery amoeba from the stools. Even when findings are negative, anti-amebic treatment is prescribed. This is based on pentavalent arsenate and iodoquinoline compounds. Treatment is usually continuous for at least 2 months.

7847

Luykx, H. M. C.

WHAT MAKES A FLYER ILL?—*Jour. Aviation Med.*, 28 (6): 523-530. Dec. 1957.

DLC (RC1050.A36, v. 28)

The amount of illness reported depends among other things on the definition used for "illness". Illnesses defined so as to include less severe conditions provide not only a higher count, but a different distribution with respect to diagnostic classification. Flyer groundings add up to more than twice as many cases as the number which would normally be considered disabling for nonflyers. For U. S. Air Force flyers, total groundings exceed excusals from all duty by some 300% for respiratory illnesses, by 200% for accidents, by nearly 100% for digestive conditions, and by nearly 300% for eye and ear conditions.

7848

Markovits, A. S.,

and R. B. Phillips

LUNG COLLAPSE IN AVIATION.—*Jour. Amer. Med. Assoc.*, 164 (14): 1569-1571. Aug. 3, 1957.

DLC (R15.A48, v. 164)

A case is reported of a pilot who experienced spontaneous pneumothorax while performing a power dive in a high-performance aircraft. Possible conditions which brought about this case are: (1) decreased atmospheric pressure which would tend to rupture a pleural bleb (cabin pressure was about 15,000 ft.); (2) g force encountered in pull-out from the dive; (3) increased intrathoracic pressure from the g-suit and from the pilot's straining against it; and (4) torsion of the body while the pilot was straining his neck aft to watch a chase plane. A conservative program is suggested for dealing with pilots who incur spontaneous pneumothorax during flight.

7849

Mathewson, F. A. L.,

and F. H. Harvie

COMPLETE HEART BLOCK IN AN EXPERIENCED PILOT.—*Brit. Heart Jour.* (London), 19 (2): 253-258. April 1957. DNLM

A pilot, aged 33, with congenital complex heart block was followed for ten years. He flew over 3000 hours in conventional and jet aircraft, including advanced operational flying. He experienced no adverse symptoms while in the air and showed a normal g tolerance and normal response to anoxia. Certain observations concerning the response of the atrial and ventricular pacemakers are included. (Authors' summary)

7850

Moseley, H. G.

LETHAL LESIONS INCURRED IN AIRCRAFT ACCIDENTS.—*Amer. Jour. Surg.*, 93 (4): 747-750. April 1957. DLC (RD1.A37, v. 93)

The majority of fatalities in aircraft accidents

are caused by extreme forces and result in multiple lethal injuries. However, a sizable number of fatalities are caused by single identifiable lesions and present a significant challenge to the medical profession. The injuries in this category most frequently encountered are injuries to the head and burns. Also less frequently encountered, but nevertheless potentially responsive to prompt surgical intervention, are internal injuries, particularly vascular tears. Such injuries tend to be exceptionally severe and present a serious problem in medical management. Aircraft accidents also appear to present a requirement for the development of new procedures, particularly for the care of serious cranial injury, extensive burns, and vascular tears. (Author's conclusions)

7851

Nelson, E.,

and W. Haymaker

COLLOID CYST OF THE THIRD VENTRICLE OF FLYERS: REPORT OF THREE FATAL CASES.—

Jour. Aviation Med., 28 (4): 356-363. August 1957.

DLC (RC1050.A36, v. 28)

Three cases of colloid cyst of the third ventricle are presented which have implications for aircrew members and passengers. One, a pilot whose flight was grounded, died soon afterward from acute hydrocephalus due to impaction of the cyst in the third ventricle. In the other two, symptoms of acute hydrocephalus developed during flight. There is evidence that hypoxidosis as a result of aerogenic anoxia or negative and positive g forces may, by increasing intracranial pressure, induce impaction of colloid cyst in the third ventricle, with fatal results. (Authors' summary, modified)

7852

Paganelli, A.,

and B. Mancusi Caputi

[TIBIOTARSAL DISTORTION] La distorsione tibiotarsica.—Rivista di medicina aeronautica (Roma), 20 (3): 413-428. July-Sept. 1957. In Italian, with English summary (p. 427). DLC (RC1050.R56, v. 20)

Tibiotarsal distortion, frequently with knee involvement, is discussed in terms of the anatomopathological, physiopathological, symptomatological, and therapeutic aspects. Since severity of the lesion is of various degrees, it is not advisable to apply the same treatment in all cases. A precise therapeutic policy may be followed ranging from simple bandaging to plaster-of-paris-immobilization of the joint, thereby treating the injury like a fracture. The inadequacy of treatment, as to choice and duration, may be responsible for the so-called "weak ankle" which leads to unsure footing, especially while walking on uneven ground or participating in sports. This lesion is also a source of inconvenience in relation to the armed service or to work due to the frequency of its occurrence and the time necessary for treatment. In most cases patients under treatment are able to remain in the service with the exception of armed or foot services.

7853

Peña Herrera, L.

[STUDY OF GASTRODUODENAL ULCER IN A HOSPITAL OF THE PERUVIAN ANDES] Estudio de la úlcera gastroduodenal en un hospital de los Andes Peruanos.—Revista de la Asociación médica de la provincia de Yauli (La Oroya), 2 (1): 27-34. In Spanish. DNLM

Studies of gastroduodenal ulcer in patients hospitalized at Obrero Hospital, La Oroya, Peru (3,730 meters above sea level), show that the incidence is lower when compared to other parts of Peru. The proportion of gastric ulcer to duodenal is 20.66 to 1, and 66% of the cases are complicated by hemorrhage. At altitude, gastric ulcer occurs with great frequency between the ages of 21 to 30 years, and Andean natives appear to be especially susceptible.

7854

Perdriel, G.

[OCULAR INJURIES AND BURNS OF THE AVIATOR] Les traumatismes et les brûlures oculaires de l'aviateur.—Médecine aéronautique (Paris), 12 (3): 217-231. 1957. In French, with English summary (p. 231). DLC (TL555.M394, v. 12)

A review is presented of ocular injuries and burns occurring in aviators as a result of: (1) heat from aircraft accidents or from aircraft operations with phosphorus or magnesium bombs; (2) acids and gases (prevalent in aircraft mechanics); (3) thunder and lightning; (4) infrared, ultraviolet, and other radiations; and (5) atomic bomb explosions. Cataracts found among pilots are attributed to the frequency of lightning. Methods are outlined for the prevention and treatment of ocular lesions and burns, and the role of the flight surgeon in familiarizing himself with these lesions and their therapy is emphasized. In order to decrease the incidence of ocular lesions, protection of the eye by means of well-tinted, shock-proof, transparent eyeglasses is recommended.

7855

Raboutet, J.,

and M. Darcy

[SURGICAL TREATMENT OF ULCEROUS DISEASE AND THE FUNCTIONAL APTITUDE OF FLYING PERSONNEL IN REGARD TO 16 CASES] Traitement chirurgical de la maladie ulcéreuse et aptitude aux fonctions du personnel navigant à propos de 16 observations.—In: The first European congress of aviation medicine, p. 79-95. Aeromedica acta (Soesterberg, Netherlands), Special edition, 1957. In French, with English summary (p. 95). DNLM

Also published in: Médecine aéronautique (Paris), 12 (1): 41-57. 1957. In French, with English summary (p. 57). DLC (TL555.M394, v. 12)

A follow-up study of up to 14 years' duration was made of 15 gastrectomies and one gastroenterostomy which were performed in pilots; 7 were emergency operations caused by severe complications of gastroduodenal ulcers. Despite the small number of cases the following conclusions were drawn: (1) surgery for ulcers in flying personnel offers the best prospects for a permanent cure, and (2) gastrectomy or gastroenterostomy should not be considered a cause for permanent grounding of flying personnel provided sufficient recovery time is permitted. It is recommended that prior to re-entry into flying status, clinical and hematological examinations, X-rays of the anastomosis, and decompression chamber altitude tests be performed.

7856

Robert, P.,

and R. Bordes

[AN UNUSUAL CASE REPORT: BAROTRAUMATIC MASTOIDITIS] Un cas d'observation peu courante: mastoïdite baro-traumatique.—Médecine aéronau-

tique (Paris), 12 (3): 213-216, 1957. In French, with English summary (p. 216).

DLC (TL555.M394, v. 12)

A case is reported of a pilot who developed otitis media following flight, which evolved rapidly into barotraumatic mastoiditis. For several days prior to the flight the pilot had rhinopharyngitis. Right mastoidectomy was performed three weeks after the beginning of medical treatment. Excellent results were obtained, the tympanum regained its normal appearance and in a short time hearing returned to normal. The role of the flight surgeon in the prevention of this condition in flying personnel is evaluated.

7857

Rotondo, G.

[INGUINAL HERNIA INDUCED BY ACROBATIC FLIGHT] Sull'ernia inguinale provocata dal volo acrobatico.—*Rivista di medicina aeronautica* (Roma), 20 (3): 531-542. July-Sept. 1957. In Italian, with English summary (p. 540). DLC (RC1050.R56, v. 20)

Two cases are described of inguinal hernia caused by acrobatic flight in two jet pilots. In the first case, the inguinal hernia revealed itself during the flight; in the second case, it was latent and underwent sudden strangulation during an acrobatic maneuver. Both cases were treated surgically, and the pilots returned to flight duty. The pathogenetic mechanisms of these lesions are examined, taking into account the effects of centrifugal accelerations in acrobatic maneuvers. Consideration is given to the medico-legal aspects of inguinal hernia as causally related to piloting.

7858

Sataloff, J.

INDUSTRIAL DEAFNESS: HEARING TESTING AND NOISE MEASUREMENT.—xiv+333 p. New York: McGraw-Hill Book Co., 1957.

DLC (RF291.S3, 1957)

This book attempts to cover all phases of industrial deafness and to serve as a guide in solving the many problems now facing industry. It is divided into the following three parts: I, including the physics of sound, how the ear functions, the causes of deafness, effects of noise on human behavior, medico-legal aspects, and conservation of hearing in industry; II, including principles of noise measurement, damage-risk criteria, ear protectors, principles of noise abatement, and audiometric test rooms; and III, treating measurement of hearing loss, audiometry, ear examinations and histories, auditory fatigue, presbycusis, malingering, handicapping effects of deafness, interpretation of hearing tests, and role of the industrial physician and otologist.

7859

Schechter, D. C.

AEROTITIS MEDIA. — *A.M.A. Arch. Otolaryngol.*, 66 (2): 117-126. Aug. 1957. DLC (RF1.A7, v. 66)

A review is presented of the etiology, symptomatology, diagnosis, prognosis, and treatment of aerotitis media. It is generally agreed that the disease is caused by an obstruction of the eustachian tube and the subsequent failure to properly ventilate the tympanic cavity during rapid pressure changes. Causes for the obstruction are discussed in detail. Symptoms of pain, deafness, and hemorrhaging are mentioned. Diagnosis by otoscopy is stressed as the most useful method, and it is urged that nasopharyngoscopy be used for discovering tubal ob-

struction. The management of the disease consists of prevention, active treatment, and correction of contributing factors. It is emphasized that people who fly or use aircraft should be indoctrinated in the basic techniques of proper ventilation to reduce the incidence of the disease. Pilots should not be allowed to fly until all symptoms or contributing factors have disappeared. (61 references)

7860

Szmyd, L.,

and C. M. McCall

AIR EVACUATION OF MAXILLOFACIAL PA-

TIENTS.—School of Aviation Medicine, Randolph Air Force Base, Tex. Review no. 2-58, Oct. 1957. 9 p. AD 152 905 UNCLASSIFIED

Extensive research in the areas of motion sickness, mechanical phases of air transportation, and physiologic factors in flight has brought about advancements in the technics of air evacuation of maxillofacial injuries. Early temporary stabilization in facial trauma cases has vital therapeutic implications. It will aid in the control of shock, infection, pain, swelling, trismus, and hemorrhage, and will promote patient comfort, simplify feeding, improve morale, and reduce the need for nursing care. A combined wiring-head bandage technic recommended for medical officers is presented. The prophylactic measures instituted by the flight surgeon to reduce the incidence of motion sickness include dietary control, psychotherapy, and the use of drugs. The hazards of indiscriminate removal of intermaxillary fixation in order to transport maxillofacial patients are pointed out. Two simple, but effective, quick-release mechanisms of jaw fixation are described and illustrated. (Authors' summary and conclusions) (27 references)

7861

Thornburn, W. B.

OBSERVATIONS ON THE INCIDENCE OF UPPER RESPIRATORY INFECTIONS IN A ROYAL AIR FORCE FORMATION IN SOUTHERN RHODESIA.—*Brit. Jour. Preventive and Soc. Med.* (London), 11 (1): 36-40. Jan. 1957. DNLM

From 1947 to 1952, the incidence of upper respiratory infections among Royal Air Force personnel in Southern Rhodesia was higher than among those serving in other parts of the world. These infections were particularly prevalent in air crews, acute tonsillitis being the commonest infection. A study of the domestic and occupational environment of air-crew and ground personnel shows that an occupational factor related to flying might be responsible for the high incidence in the former. Aircrews are constantly exposed to low absolute humidities at high altitudes during flight, a probable occupational factor responsible for the prevalence of tonsillitis among them.

7862

Viadro, M. D.

[THE EXPERIMENTAL TRAUMATIC SHOCK IN ANIMALS IN THE RARIFIED ATMOSPHERE] Eksperimental'nyi travmaticheskiy shok u zhivotnykh v razrezhennoi atmosfere. — *Voenno-meditsinskii zhurnal* (Moskva), 1957 (3): 93. March 1957. In Russian. DLC (RC970.V55, v. 1957)

Shock was induced in 50 dogs in a pressure chamber at a simulated altitude of 10,000 m. by mechanical trauma of the soft tissues of the hind legs. During shock there was a decrease of the arterial pressure (to 45-45% of the initial value),

of the rectal temperature (by 3.25°C.), of hemoglobin (8%), and of the erythrocyte number (by 750,000-1,320,000/cu. mm.). Yet death never occurred at altitude, and there was a tendency for the normalization of the blood pressure. As soon as the animals were brought to lower altitudes, the shock increased, resulting in the deaths of animals. This phenomenon is explained as the result of a decrease of protective cortical inhibition initially induced by hypoxia. Small doses of morphine (0.076-0.088 ml./kg. of 1% solution) prolonged the survival time of the animals by preventing the increase of shock after descent to lower altitudes. These data may be utilized in the elaboration of shock-preventive measures in air crews.

7863

Vincentelli, P. A.,

and I. F. Spinelli

[THE MOST FREQUENT ALTERATIONS OF THE ELECTROCARDIOGRAM IN FLYING PERSONNEL] Le più frequenti alterazioni dell'elettrocardiogramma nel personale aeronavigante.—*Rivista di medicina aeronautica* (Roma), 20 (3): 450-454. July-Sept. 1957. In Italian, with English summary (p. 453).

DLC (RC1050.R56, v. 20)

During the periodic medical examination of flying personnel at the Medico-Legal Institute, Rome, the electrocardiograms of 1000 subjects were studied. Alterations classified as "beyond the normal limits" were found in 361 persons. Specifically, the tracings showed: 301 persons with rhythm disturbances; 31, with disorders of auriculo-ventricular conduction; 180, with delayed intraventricular conduction; 67, with conduction disorders due to right bundle branch; and 5, with signs of myocardial disorder. None of the subjects complained of any disorder. No conclusions are drawn on the significance of the electrocardiographic alterations.

7864

Ward, W. D.

HEARING OF NAVAL AIRCRAFT MAINTENANCE PERSONNEL. — *Jour. Acoust. Soc. Amer.*, 29 (12): 1289-1301. Dec. 1957. DLC (QC221.A4, v. 29)

Audiograms were obtained on 1200 naval enlisted men at Naval Air Station Cecil Field, Florida. Although hearing losses were slightly greater among men who were or had been exposed to noise from reciprocating engines and jets without afterburner, this was probably due to the fact that these men were also exposed to more gunfire. Follow-up audiograms taken on 220 of these men (all men in three squadrons whose planes had afterburners) revealed no additional hearing loss after seven months of moderate exposure. A similar negative result was found in a study of flight-deck personnel during a three-month cruise aboard an aircraft carrier. (Author's abstract)

7865

Weber, R. F.,

and R. P. Moss

DENTAL INCIDENT RATE IN PARACHUTING.—*U. S. Armed Forces Med. Jour.*, 8 (9): 1363-1365. Sept. 1957. DLC (RC970.U7, v. 8)

In order to ascertain whether parachuting causes more dental accidents than other military activities and whether a man should remove his prosthetic appliance while parachuting, a survey was made of 178,672 jumps over a period of 18 months. In all

there were only 8 dentures lost, 3 dentures broken, 3 natural teeth broken and 1 mandible broken. The dental accident rate was about 0.01% of the completed jumps. It appears that there is no significant hazard in parachuting to those wearing dentures, and that the accident rate is not significantly greater than in other services.

7866

Wulfften Palthe, P. M. van

THE MARKS ON THE SKIN IN SOME PHACOMATOSSES.—*Aeromedica acta* (Soesterberg, Netherlands), 5: 359-379. 1956/57. In English. DNLM
Also published in: *Folia psychiatrica neurologica et neurochirurgica neerlandica* (Amsterdam), 60 (3): 173-186. June 1957. In English. DNLM

Several case reports are given of Recklinghausen's neurofibromatosis and Klippel-Trenaunay's disease diagnosed in career pilots after years of flying. Great importance is attached to hyperpigmentation and teleangiectasia, varicose and distended veins, and thickened nerves as clues in the diagnosis of these cases during the medical examination of Dutch pilots and pilot candidates. Of the latter group a complete somatotyping was carried out in 1000 young men. Monosymptomatic expression was found in great numbers in this group, i. e., 71 cases of café-au-lait mark, and 60 cases of varicose and distended veins. It is stressed that the monosymptomatics are minor varieties or formes frustes of so-called phacomatoses. The common denominator in all of these diseases is a hereditary dysembryoplasia, giving rise to structural anomalies in the ecto- and mesodermal tissues. Marked deformities of the bones are often disclosed by X-rays after the clue has been furnished by small circumscribed cutaneous dyspigmentation. (Author's summary, modified)

d. Pharmacology

7867

Anderson, G. R.

SELF-MEDICATION, R FOR AN ACCIDENT.—*Combat Crew* (Strategic Air Command), 8 (4): 14-17. Oct. 1957. DLC (UG633.A15, v. 8)

A person of flying status should be treated by the flight surgeon and not resort to self-medication. Antihistaminics used in treating the common cold may cause drowsiness and extreme depression and create a definite hazard if attempts to fly are made while using them. Prophylactic drugs, such as quinine used as antimalarial treatment, frequently cause ringing of the ears and occasionally deafness. The use of atropine-like substances found in Banthine and other airsickness pills cause sufficient blurring of vision to be dangerous. Tranquilizers produce severe episodes of diarrhea, cramps, gas, double vision, nausea, and generalized skin reactions. Amphetamines primarily affect the central nervous system, and oral antibiotics, such as aureomycin, can cause severe diarrhea in certain individuals. Any diseases warranting the use of highly specific medication should result in temporary grounding. Self-treatment by individuals does not always involve the use of drugs but procedures equally dangerous, such as pinching boils, dieting, etc.

7868

Balanina, N. V.

[THE EFFECT OF SOME PHARMACOLOGICAL

AGENTS AT DECREASED BAROMETRIC PRESSURE] O deistvii nekotorykh farmakologicheskikh veshchestv v usloviakh ponizhennogo barometri-cheskogo davleniia. — Arkhiv patologii (Moskva), 19 (1): 37-40. 1957. In Russian. **DNLN**

The administration of urethane (the optimum dose is 1 ml. of a 20% solution/100 g. body weight) induced sleep and increased hypoxia tolerance in rats exposed to simulated altitudes of 12,000-14,000 m. Doses other than optimal had no such effect and the animals died earlier than the control groups. Histologically, urethane prevents major pathological changes of the respiratory and cardiovascular system.

7869

Beavers, W. R.,
and B. G. Covino

EVALUATION OF GLYCINE IN FROSTBITE PROPHYLAXIS.—Arctic Aeromedical Lab., Ladd Air Force Base, Alaska. Technical Report no. 57-24, Nov. 1957. 13 p. **UNCLASSIFIED**

Glycine, an amino acid with a high specific dynamic action, was given in 30 g. oral doses to six young adult males. The individuals served as their own controls. In a 29° C. room one hour after ingestion, glycine produced an average 9.2% increase in resting metabolism. In a -17.8° C. (0° F.) cold room two hours after ingestion of glycine, metabolism continued higher and the subject had higher toe, forehead, and average body temperatures. No differences were noted in finger temperatures, but forefinger blood flow was greater when glycine was ingested. Glycine may be of practical value in increasing heat production under certain conditions. (From the authors' abstract)

7870

Kan, G. S.

EFFECT OF STREPTOMYCIN ON RESISTANCE OF ALBINO MICE TO OXYGEN LACK. — Bull. Exper. Biol. and Med. (Consultants Bureau, New York), 41 (3): 223-224. 1957. **DLC (R850.B8, v. 41)**

English translation of item no. 6368, vol. V.

7871

Margaria, R.,

T. Gualtierotti, D. Spinelli, and C. Morpurgo
CHANGES IN ELEMENTARY NEURON ACTIVITY PRODUCED BY SOME NEUROTROPIC DRUGS.— In: Aeronautical preventive medicine, p. 49-75. North Atlantic Treaty Organization, Advisory Group for Aeronautical Research and Development. AGARDograph no. 36, Nov. 1957. AD 233 126

UNCLASSIFIED

Five parameters (motor and sensory conduction speed of nerve fibers, central reflex time, end-plate delay, autogenetic inhibition of efferent components of spinal cord) which are constant in normal conditions show peculiar changes in several stress states such as hypoglycemia, hypoxia, muscular exercise, etc. In order to determine the effect of some well known neurotropic drugs and to study whether and how these counteract the effects due to fatigue or hypoglycemia or general stress, 14 drugs were tested on 5 volunteers, aged 21-25. Inducing an increase in central delay were acetylcholine, cortisone, succinylcholine, Ritalin, barbiturates, ethanol, and noradrenaline; producing no change in central delay, adrenaline, Antipar, Tefamin, Atarax; and decreasing central delay, chlorpromazine, caffeine, and atropine.

7872

Moyer, J. H.

EFFECTIVE ANTIEMETIC AGENTS.—Med. Clinica North America, 41 (2): 406-427. March 1957. **DLC (RC60.M4, v. 41)**

For the prophylactic treatment of seasickness, where it may be necessary to continue medication for several days, the antihistaminic Bonamine (Meclizine) is the drug of choice, primarily because of the convenience of less frequent administration. For air travel prolonged duration of action is less important, and scopolamine is the most effective prophylactic agent. However, since the untoward effects (sedation, dizziness, dry mouth, weakness, fatigability, etc.) of scopolamine are more frequent and increase with readministration, Bonamine, Phenergan, and Maresine are often used with good results, Bonamine being the agent of choice. Included is a review of the mechanism of vomiting, general pharmacology of antiemetic drugs (Benadryl, Dramamine, Bonamine, Bonadonin, Maresine, Phenergan, Thorazine, Compazine), and the side effects of antiemetic drugs. (134 references)

7873

Pearson, R. G.

THE EFFECTS OF BENADRYL AND DRAMAMINE ON PERCEPTUAL-MOTOR SKILL.—School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 57-50, Jan. 1957. 3 p. **UNCLASSIFIED**

This investigation was designed to evaluate the effects of diphenhydramine hydrochloride (Benadryl), 50 mg., and dimenhydrinate (Dramamine), 100 mg., upon performance on a complex perceptual-motor task. Forty-eight subjects, having received preliminary training on the task, were equally and randomly assigned to one of three drug-treatment groups, then continued at the task for a period of 4 hours. Analysis of the performance data showed both diphenhydramine hydrochloride and dimenhydrinate to impair performance as compared with placebo medication. There was no significant difference between the performance of the diphenhydramine hydrochloride and dimenhydrinate groups. Previous findings with other preparations are compared and discussed. (Author's abstract)

7874

Pearson, R. G.

THE EFFECTS OF MOTION-SICKNESS PREVENTIVES IN ORIENTATION IN SPACE.—School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 58-7, Nov. 1957. 7 p. AD 152 815 **UNCLASSIFIED**

Evaluations are made of the effects of meclizine, cyclizine, and promethazine on a test of spatial orientation. Dextroamphetamine sulfate, a mixture of scopolamine with diphenhydramine hydrochloride, and lactose placebo were also included in the experimental design. Ninety-six subjects were tested in a darkroom on a luminous rod-and-frame apparatus under upright and body-tilt conditions. Following this, they were randomly assigned in equal numbers to the drug treatment groups, then were tested again. Analysis of constant errors in adjusting the rod to the vertical for the posttreatment data revealed no significant drug effects. These results seemed to constitute evidence against the possibility that these drugs would have an untoward effect upon the spatial orientation of aircrew personnel. (Author's abstract)

7875

Ponomarev, M. F.

[THE EFFECT OF CAFFEINE AND BROMINE ON THE TIME OF A SIMPLE MOTOR REACTION] O vliianii kofeina i broma na vremia prostoi dvigatel'noi reaktsii [Abstract]. — Voenno-meditsinskii zhurnal (Moskva), 1957 (5): 92-93. May 1957. In Russian. DLC (RC970.V55, v. 1957)

The administration of 0.6 sodium bromide decreased the latency component of a simple motor reaction without effecting the motor component in 24 subjects tested at 30-minute intervals. Caffeine sodiobenzate, on the other hand, in a dose of 0.12, decreased the motor and prolonged the latency component of the reaction. Bromides being inhibitors, and caffeine a stimulant, the duration of the latency component depends on an inhibiting process, and the motor component on a stimulating process in the cerebral cortex.

7876

Reitan, R. M.

THE COMPARATIVE EFFECTS OF PLACEBO, ULTRAN, AND MEPROBAMATE ON PSYCHOLOGIC TEST PERFORMANCES. — Antibiotic Med. & Clinical Therapy, 4 (3): 158-165. March 1957. DNLM

A group of 12 healthy subjects was tested at weekly intervals after receiving placebo, meprobamate, or the neurosedative Ultrán. A Latin-square design was used for equal distribution of practice effect and sequence of medication. The effect of heavy doses (four times the clinically recommended dose) shortly before testing was investigated. The results indicated significantly better performances on placebo than on either drug. Certain differences in the effects of the drugs also were found on individual tests, but, for the battery of tests as a whole, there was no difference. The tests were relevant to the effects of the drugs; in heavy doses, the effect is one of impairment. (From the author's summary)

7877

Vasil'ev, K. G.,

I. S. Karev, N. V. Lazarev, E. I. Liubliina, and V. G. Ovcharov

[ON THE POSSIBILITY OF INCREASING RESISTANCE OF THE ORGANISM TO THE EFFECTS OF NOXIOUS ENVIRONMENTAL FACTORS] O vozmozhnosti povysheniia ustoiichivosti organizma k deistviu vrednykh faktorov sredy. — Gigiena truda i professional'nye zabollevaniia (Moskva), 1 (2): 19-24. March-Apr. 1957. In Russian. DNLM

Several chemical agents were used in experiments on animals to determine their effects upon the organism subjected to altitude and acceleration. It was found that ginseng root extract and Dibazol [2-benzylbenzimidazole hydrochloride] were most effective. Both agents (ginseng to a lesser degree) prevented the decrease or inhibition of conditioned responses in rabbits at a simulated altitude of 6,000 m.; equally, both agents normalized the summation of subthreshold impulses of high frequency in rabbits breathing air or air mixtures with a high nitrogen content. Dibazol administered intravenously delayed orthostatic hypotension and tachycardia in "space" for 4-5 days, increased the survival of mice exposed to electric currents and acceleration. It increased the resistance to manganese chloride in mice and to sodium cyanide in cats. Ginseng increased the resistance to benzol, lead, and phosphorus.

7878

Webb, P.

THERMOREGULATION IN THE ATROPINIZED SUBJECT [Abstract]. — Federation Proceedings, 16 (1, part 1): 134. March 1957.

DLC (QH301.F37, v. 16)

Administration of atropine parenterally has been found to be effective as a means of achieving a sweatfree state in a resting subject in heat. The thermoregulatory capacity of such a preparation is greatly reduced, not only because of inability to sweat, but also because of reduced adjustability in vasomotor tone. Body temperature is therefore strongly influenced by the environmental conditions. Experiments will be reported in which fully atropinized subjects were exposed to cold, comfortable, and warm environments, and their thermoregulatory responses evaluated. (Author's abstract)

7879

Zlotnikov, S. A.

[ON THE EFFECT OF COCAINE ON THE VESTIBULAR REFLEXES] O vliianii kokaina na vestibuliarnye refleksy. — Vestnik oto-rinolaringologii, 19 (3): 68-71. 1957. In Russian, with English summary (p. 71). DLC (RF1.V4, v. 19)

Cocaine had no significant effect upon the duration of post-rotatory nystagmus in rabbits, but increased it in cats. Sympathectomy did not alter its effect upon cats. Cocaine starts to act upon the vestibular function much earlier than upon any other organ.

e. Transportation and Hospitalization of Patients

7880

[AEROMEDICAL EVACUATIONS IN ALGERIA] Les évacuations sanitaires aériennes en Algérie. — Forces aériennes françaises (Paris), 11 (122): 93-102. Jan. 1957. In French.

DLC (UG635.F8F66, v. 11)

Experiences in Algeria using civilian or military aircraft to evacuate wounded and sick persons are discussed. Consideration is given to the organization of aeromedical personnel and their handling of patients during flight. Contraindications for aerial transport of wounded persons exist, but are rare in the early stages. Helicopter transport is preferable for the severely injured.

7881

[AIR EVACUATION] Evacuation par air. — Force aérienne, Service de santé, Bulletin technique d'information [Bruxelles], 1957 (Aug.): 13. In French. DNLM (W1.BE4625)

Experiences of the United States Air Force Medical Service has shown that chlorpromazine and promazine are of great value when used to sedate psychiatric patients evacuated by air. Their principal advantage is that they allow the patient a certain degree of consciousness while keeping him calm. Three antihistaminics (meclizine chlorhydrate, piperazine chlorhydrate, promethazine chlorhydrate) were approved for use in the prevention of motion sickness by the armed forces.

7882

Berg, H. H.

[ON AN UNRECOGNIZED DANGER TO PATIENTS IN

FLIGHT TRAVEL] Über eine bisher nicht bedachte Gefährdung von Kranken bei Flugreisen.—Hippokratēs (Stuttgart), 28 (9): 279-280. May 15, 1957. In German. DNLN

After an observation that mayonnaise was served at four stop-overs during a five-hour flight in Germany, the author warns of resulting dangers of fat-stress to cardiac patients. Individuals with coronary impairments suffer disturbances of microcirculation coupled with sensations of oppression of the cardiovascular type three hours after a meal rich in fats.

7883

Braswell, L. R.

PROGRESS IN AEROMEDICAL EVACUATION.—U. S. Armed Forces Med. Jour., 8 (2): 235-242. Feb. 1957. DLC (RC970.U7, v. 8)

With only two fatalities in transporting over a third of a million patients by the Military Air Transport Service, air evacuation is one of the safest modes of transport. The dangers of transporting patients having communicable diseases are now decreased because of preventive medicine and the standard isolation techniques that are now adapted to airplanes. The Convair C-131A, which is the first plane to be fitted at the factory for patient transport, is described in detail as to its various physical features and medical equipment.

7884

Campbell, D. N.

THE SASKATCHEWAN AIR AMBULANCE TECHNICAL AND OTHERWISE.—Canad. Aeronaut. Jour. (Ottawa), 3 (6): 195-200. June 1957. DLC (TL501.C2713, v. 3)

The Saskatchewan Air Ambulance Service is described including its personnel and equipment, purpose, and costs as well as its piloting, nursing, and aircraft maintenance procedures. Since its inauguration, advanced medical resources, which at one time were accessible to city dwellers only, have become available to the country and small town resident at all times of the year. The cost to the patient for in-province emergency flights has not varied since the time the service began in 1946 and remains \$25.00 regardless of distance. The over-all cost of the service to the people of Saskatchewan is about 20 cents per capita per year. There is no doubt that lives have been saved which otherwise would have been lost. Perhaps the greatest value is in the sense of psychological security enjoyed by the rural population who are assured that the air ambulance is always available to get them to a distant hospital on short notice.

7885

Danilov, V. E.,

A. I. A. Kavyrshin, and V. T. Baranov
[TOLERANCE OF PILOTS WITH CARDIOVASCULAR DISEASES TO THE CONDITIONS IN THE ALTITUDE CHAMBER WITH THE USE OF THE KP-14 OXYGEN SYSTEM] Perenosimost' prebyvania v barokamere letchikanii s zabolevaniiami serdchno-sosudistoi sistemy pri pol'zovanii KP-14 [Abstract].—Voenno-meditsinskii zhurnal (Moskva), 1957 (7): 82. July 1957. In Russian. DLC (RC970.V55, v. 1957)

Thirty-seven pilots (20-37 years old) with vasomotor hypertension, first degree hypertention, or extrasystoles were exposed for 5-6 hours to 8000-

10,000 m. simulated altitude while oxygen was supplied by a KP-14 system. Six of 19 hypertensive patients, and 7 of 18 patients with extrasystoles complained of tiredness. The fatigue was evident in the inability to solve simple arithmetic problems, changes in handwriting and heart rate, and a respiratory deficit. Some of the patients lost weight as a result of excessive sweating. Slight electrocardiographic changes were observed. Extrasystoles disappeared in some, decreased in others. Urinalysis showed no deviation from normal. At 10,000 m. 8 patients developed decompression pains, too severe to continue the experiments. It was shown that cardiac patients can tolerate 8000-10,000 m. altitudes with adequate oxygen supply.

7886

Derlath, S.

[GUIDELINES FOR MEDICAL ADVICE CONCERNING FLIGHT TRAVEL] Richtlinien für die ärztliche Beratung vor Luftreisen.—Münchener medizinische Wochenschrift (München), 99 (9): 289-290. March 1, 1957. In German. DNLN

In view of the popularity of air travel, the author surveys in outline form various diseases or conditions in which air-travel is contraindicated or should be avoided.

7887

Duchene,

Vigne, and A. Salvagniac

[REPORT OF INCIDENTS OBSERVED DURING IN-FLIGHT PERFUSIONS] A propos des incidents observes au cours des perfusions en vol.—Médecine aéronautique (Paris), 12 (3): 267-271. 1957. In French, with English summary (p. 271). DLC (TL555.M394, v. 12)

Perfusion experiments were performed on anesthetized dogs exposed to a simulated altitude of 4,000 meters in a decompression chamber. Aside from venous spasm, a major incident of in-flight transfusion was the reflux of liquid into the needle air intake. In order to prevent venous spasm, the use of perfusion apparatus fitted with a flow-accelerator is recommended. The use of a large needle having an air intake exceeding the level of the liquid enables the operator to avoid the back-flow of the perfusion liquid into the air intake.

7888

Ernst, F. H.

EFFECTS OF SEDATION ON AIRBORNE PSYCHIATRIC PATIENTS.—U. S. Armed Forces Med. Jour., 8 (5): 704-707. May 1957. DLC (RC970.U7, v. 8)

In giving 329 patients amobarbital and 296 patients phenobarbital there did not appear any significant difference in the two drugs in flights ranging from 2 to 12 hours. After sedation only 2.6% of the patients produced a serious nursing problem, 9.1% produced a slight problem and 88.3% produced no problem at all. Resedation is urged on long flights for patients with a history of assaultiveness.

7889

M., P.

and J. P. D.

PRESENT POSITION WITH REGARD TO MEDICAL EVACUATIONS BY HELICOPTERS (Etat actuel des évacuations sanitaires par hélicoptères).—Bulletin

international des Services de santé des armées de terre de mer et de l'air (Liège), 30 (4): 151-153. April 1957. In English and French.

DLC (RC970.B77, v. 30)

The conditions under which helicopters can best be utilized for the transportation of sick and wounded are discussed. Some of the advantages, including safety, speed, comfort, and facility of use of helicopters are described. The utilization of these aircraft for medical evacuation, transport of personnel and medical equipment, and rescue of men in enemy territory is discussed. Article 36 of the Geneva convention as applied to the protection of medical aircraft is reprinted, and a discussion of the problem of protecting medical helicopters is given.

7890

Monnier, R.

[MEDICAL HELICOPTERS IN INSURRECTIONAL WARFARE] L'hélicoptère sanitaire dans la guerre insurrectionnelle.—Bulletin international des Services de santé des armées de terre de mer et de l'air (Liège), 30 (6): 230-241. June 1957.

DLC (RC970.B77, v. 30)

Disadvantages are discussed of the organization of the medical battalion and the surgical station as observed in the Indochina and Algerian insurrections. The appearance of the helicopter in these wars revolutionized medical transportation. The advantages and disadvantages of the helicopter are cited, but the drawbacks are of little importance when compared to the helicopter's adaptability, safety, speed of evacuation, comfortableness, and morale-boosting effect. (Author's summary, modified)

7891

Monnier, R.

[TWO YEARS OF MEDICAL EVACUATION BY HELICOPTERS IN NORTH AFRICA] Deux ans d'évacuation sanitaire par hélicoptères en Afrique du Nord.—Revue du Corps de santé militaire (Paris), 13 (3): 392-397. Sept. 1957. In French. DNLM

Based on two years of experience with primary aeromedical evacuation in North Africa, during the Algerian crisis and in cases of accidents or emergencies, it was found that the helicopter was the fastest (10-30 minutes of flying time) and safest means of transporting wounded and sick persons. Secondary evacuation was carried out by large transport planes. It is recommended that all medical services be in the possession of helicopters and airplanes staffed with medical personnel for use in medical evacuation in peace and in times of war.

7892

Page, T. N.,

and S. H. Neel

ARMY AEROMEDICAL EVACUATION.—U. S. Armed Forces Med. Jour., 8 (8): 1195-1200. Aug. 1957.

DLC (RC970.U7, v. 8)

A brief history of the development of the Army aeromedical evacuation service from its beginning in the Korean War to the present is given. A critical analysis of the Army's policy of emergency frontline evacuation and the operational procedures in this area are discussed.

7893

Pillsbury, R. D.,

B. G. MacMillan, and C. P. Artz

EXPERIENCES IN AIR EVACUATION OF SEVERELY

BURNED PATIENTS.—Military Med., 120 (3): 203-204. March 1957. DLC (RD1.A7, v. 120)

From the experience of the Korean War and the present evacuation service of the Military Air Transport Service, the Surgical Research Unit at Brooks Army Medical Center, Fort Sam Houston, Texas, has developed a rapid method of evacuating and treating severely burned patients. It is shown that the first 24-36 hours of injury is the safest time for moving the patient and that from 48 to 72 hours of injury movement is detrimental to the patient. The Surgical Research Unit can within two hours of notification have a team of burn specialists with their specialized equipment enroute to the patient. The research unit has set up three categories of patients, ranging from the moderately burned who do not need specialized treatment during evacuation to the most severely burned, needing the services of the evacuation team.

7894

Porton, W. M.

[THE USE OF L-20-A "BEAVER" FOR AIR TRANSPORT OF THE SICK AND THE WOUNDED] Het gebruik van de L-20-A "Beaver" voor het transport van zieken en gewonden door de lucht.—Nederlands militair geneeskundig tijdschrift ('s-Gravenhage), 10 (10): 305-308. Oct. 1957. In Dutch.

DLC (RC971.N4, v. 10)

Equipment of the L-20-A "Beaver" aircraft is described for air transportation of different classes of sick or wounded individuals. Certain instructions are given on ways how to adapt the facilities to meet the requirements of individual patients.

7895

Suktrakool, Y.

[PROGRESS IN AEROMEDICAL EVACUATION].—Royal Thai Air Force Med. Gaz. (Bangkok), 6 (4): 288-293. Aug. 1957. In Thai, with English abstract (p. 293). DNLM

Patients considered for aeromedical evacuation are divided into two groups: those with contagious diseases, severe anemia, severe cardiac, cardiovascular, and respiratory disease who cannot be moved, and those with gastro-intestinal, minor respiratory diseases, tuberculosis, skull fracture, and maxillo-facial injury who can be transported under the supervision of nurses and medical officers. The most common problems encountered during flight which may prove hazardous for patients are variations in barometric pressure, airsickness, hypoxia, temperature changes, and air embolism. It is concluded that all types of patients may be safely evacuated in planes with pressurized cabins with proper medical supervision. (Author's abstract, modified)

7896

Szmyd, L.

ORAL SURGERY COMPLICATIONS CAUSED BY FLIGHT.—U. S. Armed Forces Med. Jour., 8 (2): 264-270. Feb. 1957. DLC (RC970.U7, v. 8)

A case history is reported that demonstrates the effects of changes in atmospheric pressure on the Schneiderian membrane of an abnormal sinus following the extraction of 2 molars. The patient one week after surgery took an airplane flight and developed a herniated antral membrane. Details of the treatment accompanied with photographs are given.

7897

Vastine, R. J.

CERTAIN CONTRAINDICATIONS TO FLIGHT.—

Skyways, 16 (8): 17, 29. Aug. 1957.

DLC (TL501.8634, v. 16)

The decreases of oxygen partial pressure and atmospheric pressure occurring with increases in altitude are discussed as they relate to medical contraindications to flying. As a guide in screening frequent users of executive aircraft, the following people should not fly: (1) pregnant women beyond the eighth month; (2) pregnant women who habitually miscarry or who have a history of premature labors; (3) infants under seven days of age; (4) people with congenital heart disease who cannot tolerate one flight of stairs; (5) anemic persons with a hemoglobin of 60% or less, also persons with sickle-cell anemia; (6) diabetics who are easily subject to insulin reaction or coma; (7) people with any active pulmonary disease, cavitation, or acute upper respiratory disease; (8) persons with heart failure in any degree; (9) people with other than controlled, symptom-free angina pectoris; (10) heart-attack patients prior to six weeks after onset; (11) people with contagious diseases; (12) bulbar poliomyelitis patients; (13) people with wired jaws, large unsupported hernias, draining or open abdominal wounds, intestinal obstruction, wet gangrene, odorous colostomies, and post-surgical patients, prior to ten days after surgery; (14) psychotic or potentially psychotic people; (15) people who do not have control of bodily functions; and (16) persons suffering from the bends.

7898

Wright, C. C.

TRANSPORTATION OF THE SICK AND INJURED IN CIVILIAN AIRCRAFT. — Jour. Amer. Med. Assoc., 165 (7): 808-812. Oct. 19, 1957.

DLC (R15.A48, v. 165)

Medical advice based on an accumulation of experience is given on the transportation of patients in civilian aircraft. The physiological and medical aspects of flight are briefly discussed. About half of the cases of unconsciousness or death which occur during flight are ascribed to cardiovascular disease. Concrete recommendations are given for the prevention and treatment of motion sickness. It is concluded that certain patients should not fly without a companion well qualified to care for them in emergencies; certain others should not fly at all. For the vast majority of patients required to travel, however, flying is swift, comfortable, and safe. (Author's abstract, modified)

f. Physical and Neuropsychiatric Examination

7900

Borman, J. G.

THE HISTORY OF PHYSICAL STANDARDS IN THE USAF.—In: Symposium: physical standards and selection, p. 15-20. Randolph Air Force Base, Tex.: Air University, 1957. AD 144 144 UNCLASSIFIED

A history is presented of physical examinations for fliers beginning with Army standards from which those of the Air Force have developed to the present. Many changes and refinements in techniques have taken place. For example, an X-ray of the chest is now routine where formerly it was used only at the discretion of the examiner; and the audiometer has replaced the whispered voice in testing hearing. However, there has been no change in the basic con-

cept that the flier should be active, vigorous, and in prime physical condition, free from all but the most minor physical or emotional imperfections. He is also required to have nearly perfect vision and hearing, and to be free of any evidence of neurocirculatory inefficiency. These were all factors considered in the very early examinations.

7901

Bron', A. I.

[A DEVICE FOR THE DETERMINATION OF THE CLOSE POINT OF CLEAR VISION, THE CONVERGENCE OF THE DOMINANT EYE, AND THE BINOCULAR VISION] Pribor dlia opredeleniia blizhai-shei tochki iaznogo areniia, konvergentsii vedushchego glasa i binokuliarnogo areniia. — Voenno-meditsinskii zhurnal (Moskva), 1957 (12): 73-75. Dec. 1957. In Russian. DLC (RC970.V35, v. 1957)

A device is described for the determination of the close point of sharp vision, convergence of the dominant eye, and for the establishment of the presence of binocular vision. It is a relatively simple instrument.

7902

Clark, K. L.

PULMONARY FUNCTION STANDARDS.—In: Symposium: physical standards and selection, p. 21-26. Randolph Air Force Base, Tex.: Air University, 1957. AD 144 144 UNCLASSIFIED

Pulmonary function tests are objective techniques for obtaining quantitative information on various physiologic functions of the lungs including ventilation, distribution, diffusion, and perfusion. Of these, only ventilation can be tested easily with well-designed, easy-to-use equipment. Significant obstructive or restrictive impairment can be determined with the following: the maximum breathing capacity, the timed vital capacity, and the vital capacity. The first two primarily measure air flow; the third measures especially the lung capacity to hold air. It is suggested that selected studies of ventilation be more widely used in: (1) the selection of flying personnel; (2) the selection and preventive follow-up studies of individuals exposed to occupational hazards to the lungs; (3) the evaluation of flying personnel with suspected pulmonary disease and those recovering from chest surgery, in order to increase the salvage rate; and (4) disability retirement evaluations. Techniques and acceptable standards for these tests are suggested and examples are given of some typical test results.

7903

Evrard, E.

[CARDIOVASCULAR RESISTANCE TO INTENSE EFFORT: TRIAL APPLICATION OF MEDICO-SPORTIVE CONTROL] Résistance cardio-vasculaire à l'effort intense: essai d'application au contrôle médico-sportif. — Acta belgica de arte medicinali et pharmaceutica militari (Bruxelles), 110 (3 bis): 403-415. Oct. 1957. In French, with English summary (p. 414). DNLIM

Also published as: Evaluation de la résistance cardio-vasculaire à l'effort intense: essai d'application au contrôle médico-sportif. — Acta belgica de arte medicinali et pharmaceutica militari (Bruxelles), 110 (4 bis): 655-667. Dec. 1957. DNLIM

A comparison of the results obtained from 542 subjects (mostly pilot candidates) performing a

5-minute step test, a 3-minute step test, and a 1-minute hopping test shows that the latter test is of no value in evaluating cardiac tolerance during physical effort. Correlation of the results of both step tests is to be interpreted carefully and within close limits when this comparison is made on an individual basis. These tests are of value in evaluating cardiovascular function and may be used in the elimination of unsuitable subjects from pilot training. A formulated index of cardiac tolerances during exertion for the 3-minute step test is empirically established and discussed.

7904

Prolov, G. F.

[IMPROVEMENT OF THE METHODS FOR EXAMINING THE ACUITY OF DISTANCE VISION] Uлучshenie metodov issledovaniia ostroty zreniia dlia dali. — Voenno-meditsinskii zhurnal (Moskva), 1957 (12): 42-48. Dec. 1957. In Russian.

DLC (RC970.V55, v. 1957)

The author describes a portable device for the testing of visual acuity, which avoids certain errors which may occur when conventional testing devices are used.

7905

Glorig, A.,

and J. D. Harris

AUDIOMETRIC TESTING IN INDUSTRY. — In: Handbook of noise control, p. 6-1 to 6-24. Ed. by C. M. Harris. New York: McGraw-Hill Book Co., 1957.

DLC (TA365.H3)

The equipment, calibration, test environment and procedure, and rating scales for pure-tone audiometry used in industrial hearing conservation programs is described. Consideration is given to variation of air-conduction audiometry (group testing, sweep-frequency screening, speech and diagnostic audiometry), and automatic audiometry. Included are tables and charts and an appendix for hearing-conservation data card and I. B. M. code, and American Standard specifications for diagnostic audiometry.

7906

Glorig, A.

PROBLEMS IN MILITARY AUDIOMETRY: A CHABA SYMPOSIUM. VII. PRACTICAL LIMITATIONS IN MILITARY AUDIOMETRY. — Jour. Speech and Hearing Disorders, 22 (5): 750-751. Dec. 1957. DNLM

Personnel, equipment, and the test environment are the most important limitations in military audiometry. These could best be offset by establishing military specialty numbers for audiologists and audiometrists so that they may be retrained in their jobs once they are trained. Central maintenance laboratories for audiometers, staffed by civil service personnel and monitored by expert civilian consultants should be established in order to achieve technical continuity and accuracy in maintenance. Standard plans should be devised to cover the construction of sound-treated rooms or their purchase as prefabricated units. (Author's summary)

7907

Grandpierre, R.,

L. Tabusse, and R. Perles

[RESEARCH ON A FUNCTION TEST WITH EFFORT: STEP TEST] Recherche d'un test d'aptitude à l'effort:

l'épreuve de l'escabeau. — Revue médicale de Nancy, 82 (78): 865-871. Aug.-Sept. 1957. In French.

DNLM

A cardio-pulmonary function test, the step test, which is derived from the Master's step test is described. The test duration, heart rate, minute volume, and oxygen uptake were the four variables used to evaluate the subject's physical capacity. Based on oxygen debit and steady state, three types of reactions were distinguished which permitted the establishment of coefficients.

7908

Graybiel, A.

CARDIOVASCULAR STANDARDS. — In: Symposium: physical standards and selection, p. 33-39. Randolph Air Force Base, Tex: Air University, 1957.

AD 144 144

UNCLASSIFIED

Physical standards are reviewed with particular reference to the cardiovascular system, including the medical examination, analysis of the flier's task, the effect of this on the circulation, the setting up of a board for the determination of physical standards and findings, and the evaluation. In addition, the main etiologic types of heart disease (congenital, rheumatic, hypertensive, and coronary) are discussed together with the significance of these to the flier. In general, congenital heart disease does not present any great problem, and the rheumatic and hypertensive types offer no immediate problems of detection, but rejections are made because of the prospects for the future. However, with coronary heart disease the slighter and earlier grades are difficult to determine. It is a problem of normal ranges overlapping abnormal ones. Post-mortem evidence of some young Canadian fliers with this disease is cited.

7909

Hall, F. G.,

and L. C. Sappenfield

INFLUENCE OF GRADED IMPEDANCE TO TRACHEAL FLOW ON TIMED VITAL CAPACITY MEASUREMENTS. — Jour. Aviation Med., 28 (4): 397-400. Aug. 1957. DLC (RC1050.A36, v. 28)

Timed vital capacities have been determined on nine healthy young men ranging in age from twenty-one to twenty-eight years. Their normal vital capacities were determined, which varied on the average only 1 per cent from predicted values. Subsequently, four different resistances were interposed between mouthpiece and vitalometer and the volume of air which could be expelled into the vitalometer was determined. The reduction in the timed capacities varied proportionally with resistances imposed. It is suggested that this test gives a value which can be used to determine the degree of breathing obstruction in pulmonary efficiency tests. Moderate exercise during the tests does not appreciably affect the results. (Authors' summary)

7910

Hirsch, I. J.

PROBLEMS IN MILITARY AUDIOMETRY: A CHABA SYMPOSIUM. IV. A CLASSIFICATION OF HEARING TESTS. — Jour. Speech and Hearing Disorders, 22 (5): 736-743. Dec. 1957. DNLM

There are four general purposes for testing the hearing of military personnel: (1) to select or reject men as part of the regular initial physical examination; (2) to provide for the otologist information on the

state, probable cause, and progress of hearing loss; (3) to provide information that can be used in establishing the amount of hearing loss for compensation purposes and the state of the original hearing before the service-connected hearing loss developed; and (4) to enable personnel officers to determine whether or not certain individuals are qualified for certain specialties that involve special hearing ability. Not all hearing tests will suit these purposes equally well. The kind of test used will depend upon: (a) the kind of information that must be obtained from the test, (b) the number of installations at which the test must be carried out, (c) the number of persons taking the test, and (d) the requirements of the test equipment, space, and trained personnel. (Author's summary, modified)

7911

Hoople, G.

PROBLEMS IN MILITARY AUDIOMETRY: A CHABA SYMPOSIUM. III. DIAGNOSTIC AUDIOMETRY. — Jour. Speech and Hearing Disorders, 22 (5): 734-735. Dec. 1957. DNLN

Assessing hearing loss so that the exact type of loss (conductive or perceptive) and the probable cause for it can be determined is of great importance in order that intelligent treatment can be instituted. Pure-tone audiometry is the first step in a thorough diagnostic survey of hearing. By adding bone-conduction audiometry, speech audiometry, testing in the presence of masking noise, etc., to the testing routine, it is possible to distinguish among conduction and perceptive hearing losses, noise-induced hearing loss, otosclerosis, psychogenic deafness, and malingering.

7912

Jerger, J. F.,

and R. T. Carhart

CONTINUOUS VERSUS INTERRUPTED STIMULI IN AUTOMATIC AUDIOMETRY. — Northwestern Univ. Audiology Lab., Evanston, Ill.; issued by School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 56-58, March 1957. 4 p., UNCLASSIFIED

Three groups of subjects traced Békésy-type thresholds at one of three frequencies (250, 1000, or 4000 c.p.s.) for both continuous and interrupted tones. Results (interpreted in terms of their significance for the general problem of automatic audiometry) suggest that an interrupted rather than a continuous stimulus pattern should be employed in the automatic audiometric methods in which the subject traces his threshold for a fixed frequency over time by controlling the direction of movement of an attenuator moving at constant speed.

7913

Knabengof, V. G.

[ELECTROCARDIOGRAPHY IN THE PRACTICE OF THE FLIGHT SURGEON] Elektrokardiografiya v praktike vrachebno-letnoi ekspertizy. — Voenno-meditsinskii zhurnal (Moskva), 1957 (11): 59-62. Nov. 1957. In Russian. DLC (RC970.V55, v. 1957)

Electrocardiography of flight personnel is a good diagnostic aid and helps to evaluate the functional condition of the cardiovascular system. Disturbances such as sinus arrhythmia, premature systoles, flutter and fibrillation, disturbances in atrio-ventricular conduction, bundle-branch block and the Wolff-Parkinson-White syndrome can be diagnosed by the electrocardiogram.

7914

Koch, C.

[IMPORTANCE OF CUPULOMETRIC EXAMINATION IN FLYING PERSONNEL] Importanza dell'esame cupulometrico nel personale aeronavigante. — Rivista di medicina aeronautica (Roma), 20 (3): 439-440. July-Sept. 1957. In Italian, with English summary (p. 439). DLC (RC1060.R36, v. 20)

Cupulometry (van Egmond method) of 300 pilot candidates provided more adequate and reliable results than the Barany rotatory test since it is not dependent upon subjective factors as is the latter. This method, owing to its characteristics, represents a more detailed means of examination of the labyrinth, which is of great diagnostic value in the selection and training of pilot candidates.

7915

Koshel', A. A.

[PORTABLE APPARATUS FOR THE EXAMINATION OF THE ACCOMMODATION, CONVERGENCE, AND LATENT HETEROPHORIA] Portativnyi pribor dlia issledovaniia akkomodatsii, konvergentsii i skrytogo kosoglasitiia. — Voenno-meditsinskii zhurnal (Moskva), 1957 (11): 69-70. Nov. 1957. In Russian. DLC (RC970.V55, v. 1957)

A description is given of the apparatus for the examination of visual accommodation, convergence, and latent strabismus.

7916

Lamb, L. E.

THE ELECTROCARDIOGRAM IN THE SELECTION OF FLYING PERSONNEL. — In: Symposium: physical standards and selection, p. 40-45. Randolph Air Force Base, Tex.: Air University, 1957. AD 144 144 UNCLASSIFIED

Evidence is presented indicating the proven value of the electrocardiogram in detecting cardiovascular abnormalities. On the basis of this, the following three general recommendations are made: (1) An electrocardiogram should be recorded on all individuals accepted for pilot training; this will eliminate 5 persons with heart disease per thousand applicants. (2) An electrocardiogram should be recorded immediately on all flying personnel; this will eliminate risking millions and perhaps over a billion dollars worth of equipment now jeopardized by lack of an adequate cardiovascular examination. And (3) provisions should be established to permit the continued employment of personnel with now disqualifying abnormalities in a restricted category of flying.

7917

Lansberg, M. P.

[SOME OBSERVATIONS ON THE HEARING EXAMINATION AND THE BASIS OF GROUP AUDIOMETRY] Enkele opmerkingen over het gehooronderzoek en het principe der groepsaudiometrie. — Nederlands militair geneeskundig tijdschrift ('s-Gravenhage), 10 (5): 134-137. May 1957. In Dutch. DLC (RC971.N4, v. 10)

Various methods of examination for hearing loss, particularly that due to noise, are evaluated from the viewpoint of aeromedical requirements. Understanding of whispered words is an unreliable test because of incomparability between different experimental setups (differences in rooms, examiners, and test words). Shortcomings of tone audiometry are less obvious, however just as important: clicks, true

reproduction of loudness differences, deformation of harmonics, no uniform zero level, and failure to discriminate a hearing loss that is not socially handicapping from one that imposes a social handicap. Speech audiometry is of more help in determining the degree of social handicap and offers more comparable data. For use by the military aviation the Nationaal Luchtvaartgeneeskundig Centrum has developed a group tone-audiometer which can also be adapted for speech audiometry.

7918

Lawrence, M.,
and C. L. Blanchard
PREDICTION OF SUSCEPTIBILITY TO ACOUSTIC TRAUMA BY DETERMINATION OF THRESHOLD OF DISTORTION.—*Medicina del trabajo* (Buenos Aires), 22 (178): 630-638. Nov. 1957. In English. DNLM
Same as item no. 3066, vol. III.

7919

Lomonaco, T.
[PROPOSAL FOR A TRANSPORTABLE LABORATORY FOR USE IN RESPIRATORY AND CARDIOVASCULAR FUNCTIONAL EVALUATION OF ARMED FORCES PERSONNEL] *Proposta di un laboratorio autotrasportato da adottare per la valutazione funzionale respiratoria e cardio-circolatoria del personale delle forze armate.*—*Rivista di medicina aeronautica* (Roma), 20 (3): 462-476. July-Sept. 1957. In Italian, with English summary (p. 475).
DLC (RC1050.R56, v. 20)

In view of the inadequate methods and the qualitative inadequacy of the personnel used in the functional evaluation of the degree of physical training of men in the Armed Forces, a proposal is made for the adoption of "Mobile Scientific Laboratories". These would be equipped with adequate facilities and would travel to the bases to perform the necessary respiratory and cardiovascular function tests (spirometry, cycloergometry, electrocardiography, Pauling's oximetry, sphygmometry) on large groups. It is also recommended that medical personnel be trained in the science and practice of the functional exploration of organ systems. Thereafter, this trained personnel may be employed exclusively for evaluative and selective purposes.

7920

Meunargia, R. V.
[THE AURO-CARDIAC REFLEX] *K voprosu ob auro-kardial'nom reflekse.*—*Vestnik oto-rinolaringologii*, 19 (3): 87-92. 1957. In Russian, with English summary (p. 92). DLC (RF1.V4, v. 19)

Sound stimuli of different frequencies and intensities have no effect upon the heart function of children or adults with normal hearing. In deaf-mutes with some remnants of hearing and in persons with baryacusis or pseudodeafness, however, sound of threshold or superthreshold intensity induces the so-called auro-cardiac reflex. This reflex appears on the electrocardiogram (ECG) in the form of an increase or decrease of the T-P interval (sympathetic or parasympathetic reaction), or a decrease followed by increase and normalization (neurotonic reaction). This reflex, which is absent in complete deafness, is an emotional conditioned reflex, and may serve as a diagnostic test of hearing.

7921

Montagard, F.
[SYSTEMATIC PULMONARY RADIOGRAPHY OF FLYING PERSONNEL CANDIDATES] *Radiographie pulmonaire systématique du personnel navigant à l'admission.*—*Médecine aéronautique* (Paris), 12 (3): 259-271. 1957. In French, with English summary (p. 271). DLC (TL555.M394, v. 12)

Recent French regulations on physical fitness of flying personnel prescribe systematic x-ray examination of all candidates. Remarks are made about technique, and the results of pulmonary x-ray screening are illustrated by 7 case reports where x-ray examination was of particular value.

7922

Nygard, C.
AUTOMATIC GROUP AUDIOMETER.—Maico Electronics, Inc., Minneapolis, Minn. (Contract Nonr-2333(00)). Technical Report (for the period from March 15, 1957 through Nov. 30, 1957), Dec. 27, 1957. 11 p. AD 208 608 UNCLASSIFIED

Descriptions are given of efforts covering the development, fabrication, and construction of an automatic group audiometer. Various stages in the development and testing of various components (test station, power amplifier, tape recorder, acoustic calibration unit) are presented along with suggested changes needed to overcome observed deficiencies.

7923

O'Connell, M. H.
AUDITORY ACUITY MEASURED BY AUTOMATIC AND MANUAL AUDIOMETRY.—School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 58-13, Nov. 1957. 5 p. AD 152 903 UNCLASSIFIED

The School of Aviation Medicine (SAM) model 56-2 automatic audiometer provided test results significantly different from test results obtained from manual audiometry at 500 c.p.s. for both the left and right ears. The Rudmose Model ARJ-3 automatic audiometer provided test results significantly different from test results obtained from manual audiometry at 2000 c.p.s. for the right ear and at 4000 c.p.s. for both the left and right ears. Neither of the automatic audiometers provided test-retest results as reliable as the manual audiometer, except at 500 c.p.s. where the Rudmose showed higher retest reliability than either the manual or the SAM audiometer. (Author's conclusions)

7924

Plas, F.,
J. M. Melon, J. Curveille, C. Bousquet, E. Granotier, and R. Angiboust
[THE PROBLEM OF INCOMPLETE RIGHT BLOCKS] *Le problème des blocs droits incomplets.*—*Médecine aéronautique* (Paris), 12 (4): 295-312. 1957. In French, with English summary (p. 312).
DLC (TL555.M394, v. 12)

The severity of the social consequences associated with a diagnosis of partial right heart block is important to flying personnel where perfect function of the circulatory system is required. Most cardiologists agree that partial right heart block is a manifestation of a discrete right ventricular hypertrophy. This is totally different from complete right block which represents a true conduction disorder. In order to supply data for use in the official evaluation of electrocardiographic peculiarities, a discussion is

presented on the following: (1) electrogenic data obtained by simultaneous recording of several precordial leads, (2) observation of 353 cases evaluated by a statistical method, and (3) a study of changes due to the Flack test. A sharp distinction must be made between cases where the rSr' aspect is deeply modified by the Flack test and presents a picture of right cardiac hypertrophy or complete right bundle branch block, and those in which the rSr' aspect vanishes or remains unchanged.

7925

Portmann, M.,
and Beauchamp
[NEW METHODS OF INSTRUMENTAL EXPLORATION OF THE VESTIBULAR APPARATUS] Les nouvelles méthodes d'exploration instrumentale de l'appareil vestibulaire.—Revue d'oto-neuro-ophthalmologie (Paris), 29 (5): 279-286. 1957. In French. DNLM

Descriptions are presented of the progressive acceleration-deceleration test and cupulometry (Van Egmond test) using a revolving cabin with an electronic command. These tests are capable of measuring per- and post-rotatory nystagmus and are convenient to use. Electronystagmography is also used to evaluate vestibular deficiencies and nystagmus.

7926

Rager, S. N.,
and R. J. Voots
DESIGN AND CONSTRUCTION OF AN AUTOMATIC, SELF-TESTING, RECORDING, PULSE-TONE AUDIOMETER.—State Univ. of Iowa. Univ. Hospitals, Iowa City; issued by School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 57-64, April 1957. 20 p. AD 140 942. PB 130 084

A description is given of the design, construction, and testing of an automatic self-testing audiometry system (based on the Bell Telephone Laboratories technique known as pure-tone audiometry). One of the chief advantages of the system over conventional types is that it permits the subject to pace his response time thereby relieving him of the anxiety and compulsion of having to keep up with the machine. Although the audiometric system operates satisfactorily in all respects, it is not to be considered as the ultimate model for its purpose since there is still room for development and refinement.

7927

Rager, S. N.,
and R. J. Voots
EXPERIMENTAL DETERMINATION OF THRESHOLD RELIABILITIES FOR FOUR METHODS OF AUTOMATIC, SELF-TESTING, PULSE-TONE AUDIOMETRY.—State Univ. of Iowa, Iowa City; issued by School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 57-63, March 1957. 10 p. AD 140 527 UNCLASSIFIED

Development work on an automatic, self-testing, pulse-tone audiometer revealed the need for an investigation of suitable psychophysical procedures. Apparatus was designed and constructed to test the four most promising methods under automatic, pulse-tone operating conditions. 132 young adult subjects, randomly assigned, were tested at three frequencies (500, 2000, and 6000 c.p.s.) on each of two consecutive days. Statistical analysis of the data provides an estimate of precision and reliability for a comparison

of methods. Results indicate that for automatic operation with a 5-db. step attenuator, differences between methods are not large enough to be significant. (Authors' abstract)

7928

Robert, P.,
D. Semette, and P. Bugeat
[SOUND INJURY, TENDENCY TO UNCOMFORTABLE RECRUITMENT AND HEARING] Traumatisme sonore, tendance au recrutement et audition inconfortable.—Médecine aéronautique (Paris), 12 (4): 349-352. 1957. In French, with English summary (p. 352). DLC (TL555.M394, v. 12)

A total of 425 subjects (student pilots, recruits, soldiers) were examined audiometrically to determine cochlear sensitivity to noise. When a moderately intense but continuous noise (60 hours of pilot training) or a very intense but brief noise (10 sessions of gunnery practice) was used, the increases in auditory thresholds could not be considered as indications of the future reaction of the ear to noise.

7929

Slirde, E. K.,
A. K. Lents, and K. V. Gerasimova
[ON THE OBJECTIVE EVALUATION OF HEARING BY THE RHYTHM OF RESPIRATORY MOVEMENTS] Ob ob'ektivnom opredelenii slukha po izmeneniam ritma dykhatel'nykh dvizhenii.—Vestnik oto-rinolaringologii, 19 (1): 32-35. 1957. In Russian, with English summary (p. 35). DLC (RF1.V4, v. 19)

The aim of the investigation was to determine thresholds of hearing by pneumographic registration of the respiratory movements. The authors have found that sound stimuli (electric bell, audiometer), as well as light and pain stimuli lead to a change in the rhythm of respiratory movements. At the first perception of a sound, respiration is either slowed down or accelerated; when the sound is repeated, the respiratory rhythm does not change any more. Hence the phenomenon may be considered as an orientation reflex. This method can serve for detecting real deafness and distinguishing it from simulation. (Authors' summary)

7930

Webster, J. C.
PROBLEMS IN MILITARY AUDIOMETRY: A CHABA SYMPOSIUM. VI. AUTOMATIC AUDIOMETRY.—Jour. Speech and Hearing Disorders, 22 (5): 748-749. Dec. 1957. DNLM

Automatic audiometry is the type in which the subject, by his own responses, controls the intensity of the machine's output. The following automatic audiometers are now in operation: Bekesy audiometer, Rudmose audiometer, Brogan audiometer, Licklider audiometer, Ward audiometer, Glorig audiometer, and Navy audiometers. The purpose for which examination is given must first be carefully determined and specified and then the choice made between individual and group audiometry. When large groups must be tested quickly, some form of group test should be selected. Where less than 10 must be tested at a time, one of the individual types is the best type.

g. Sanitation and Hygiene (Exclusive of Cabins, for which see 11-e)

7931

[DISINSECTIZATION OF AIRCRAFT] Désinsectisation

des aéronefs.—Semaine médicale professionnelle et médico-sociale (Paris), 33 (25): 1067-1068. July 14, 1957. In French. DNLN

Disinsectization of aircraft is recommended upon landing since the plane is still hermetically sealed and both passengers and luggage may be directly exposed to insecticide action for at least five minutes. Insecticides used contain mixtures of pyrethrins and DDT. Mention is made of the handling of the water supply at airports in order to eliminate mosquitoes.

7932

Kraus, R. N.

THE AIR FORCE HEARING CONSERVATION PROGRAM.—School of Aviation Medicine, Randolph Air Force Base, Tex. Review no. 3-58, Sept. 1957. 11 p. AD 152 906 UNCLASSIFIED

The Air Force Hearing Conservation Program consists of the following aspects: (1) audiometry and otologic examination of persons upon enlistment or commission and at periodic intervals, (2) ear protection in the form of the V-51R ear defender and a suitable ear muff when indicated, (3) isolation of noise sources by test cells and distance, and (4) indoctrination of personnel in the necessity of ear protection.

7933

PREVENTIVE MEDICINE AND OCCUPATIONAL

HEALTH PROGRAM: ENGINEERING DATA.—Dept. of the Air Force, Washington, D. C. Air Force Manual no. 160-25, April 1, 1957. [146] p.

DLC (UG633.A3763)

This manual is designed principally for sanitary and industrial-hygiene engineers, but is also of value to surgeons, flight surgeons, preventive medicine officers and other medical personnel. Among the various problems considered are discussions of the physiological aspects of physical and chemical hazards, threshold limits of toxicology, human factors, noise, illumination, temperature and ventilation, health physics, water supply, sanitary sewerage, and garbage and rubbish disposal. Included are sanitary and industrial hygiene surveys, appendices, tables, and figures.

7934

Vastine, R. J.

MEDICAL ANNUAL EXAMINATIONS.—Skyways, 16 (10): 40, 87. Oct. 1957.

DLC (TL501.S634, v. 16)

Pilots are constantly exposed to stresses that are nonexistent in other occupations. In order to withstand these stresses, the body must be in good working order. If not, the body is used up compensating for disease and is unable to accept the stress of flying. Adequate medical examinations can (a) indicate evidence, at the time of the examination, of physical or mental disease, some of which may present no symptoms to the patient; (b) enable the examiner to determine the living habits of the examinee and discover any that may lead to disease production; and (c) uncover physical defects that develop from time to time that would be detrimental to the flying ability of the sufferer. The required Civil Aeronautics Administration's examination is a big step in the right direction, but the pilot for his own personal health should seek an even more extensive one. The following should be performed annually: (1) inventory of symptoms by systems and a history of any present or previous illness; (2) detailed and thorough physical examination; (3) personality analysis; (4) procto-

scopic examination; (5) audiometric examination; (6) electrocardiogram—every six months for those who show minor progressive changes; (7) chest X-ray for heart size and chest disease; and (8) complete blood count, urinalysis, sedimentation rate, blood urea nitrogen, non-fasting blood sugar, blood cholesterol, and blood serology determinations.

7935

Vastine, R. J.

THE SHAPE OF THINGS—MEDICALLY.—Skyways, 16 (11): 46. Nov. 1957. DLC (TL501.S634, v. 16)

A preliminary study of the status of medical care of flying personnel was undertaken by the Flying Physicians Association in May 1957. This was accomplished by means of a questionnaire consisting of 15 questions mailed to 1783 businesses, large and small, that had listed their aircraft as being used in their activities. The results reveal a tremendous lack of interest in the preventive medicine aspects of aviation by pilots and their employers. The requirement for hiring and maintaining personnel in most cases is merely the holding of a valid Civil Aeronautics Administration (CAA) Medical Certificate. Examinations are required in accord with CAA frequency although it is generally held by those most interested in preventive medicine that annual examinations offer the greatest yield. The use of refresher courses in the operation and maintenance of aircraft would keep flying personnel abreast of recent changes and enhance the safety of flying. Pilots must be assured that adequate medical examination and good training will not jeopardize their livelihood.

7936

WORLD HEALTH ORGANIZATION EXPERT COMMITTEE ON INSECTICIDES. SEVENTH REPORT.—

Technical Report Series no. 125. 31 p. Geneva, 1957. DNLN (W2.MW6W9t)

This report deals with the resistance of insects to insecticides. Of special interest is part 2, disinsectization of aircraft (p. 20-31), where attention is given to the question of specifying particular solvents for use in aerosol formulations. These insecticide solutions must be suitable for use inside aircraft and, when dispersed as an aerosol at the prescribed rate, must be free from fire hazard, human toxicity risks, and injurious effects on fabrics, metals, woodwork, rubber, and surface furnishings used in aircraft. They must be free from deposit or suspended matter when cooled to -5° C. or to the lowest temperature encountered in the filling operation. Aerosol formulations found effective in practice include pyrethrum extract (20% pyrethrins), DDT, non-volatile oil, and suitable solvents and propellants. Aside from the insecticide solution, consideration is given to the dispenser design and performance, disinsectization procedures, and bio-assay test for aerosols.

h. Public Health Aspects

7937

Schreuder, O. B.,

and J. G. Constantino

MEDICAL PROBLEMS IN INTERNATIONAL AIRLINE OPERATION.—New York State Jour. Med., 57 (2): 261-264. Jan. 15, 1957.

DNLN

In the interest of flight safety it is mandatory that in the psycho-physical selection of members of an aircrew, particularly pilots and flight engineers, no substandard individuals are accepted. A big problem in this area is the lack of definitive psychologic tests and the inability of the examining physician to predict accurately which persons will break down in later life because of personality, behavior, or psychoneurotic disorders. Clinical problems causing lost time for aircrew members include the diarrheal diseases (shigellosis, salmonellosis), parasitic disease, malaria, viral hepatitis, and chronic disease associated with aging. In view of the present speed of aircraft, the potentialities of the spread of disease by air is great, either by the transfer from one country to another of infected vectors or by the transportation of a passenger during the incubation or active period of the disease. These have been controlled by international immunization requirements, and disinsectisation of aircraft.

7938

Verhoeven, A. F. P. M.

[TREATMENT OF WHOOPING COUGH BY DECOMPRESSION: HISTORICAL AND CRITICAL REVIEW] Kinkhoestbehandeling door onderdruk: historisch en kritisch overzicht.—*Aeromedica acta* (Soesterberg, Netherlands), 5: 211-238. "1956/57". In Dutch, with English summary (p. 236). DNLM

Altitude treatment of whooping cough either by flight or decompression in a pressure chamber is reviewed. A reduction of coughing attacks and considerable general improvement were achieved in 80% otherwise untreated cases without complications. The best results are obtained with exposure between the third and eighth week of the acute stage. Severity of the uncomplicated case, age of the patient, the social environment, or repetition of the exposure are without any effect on the results. Caisson exposure gave results equivalent to actual flight. The mechanism responsible for the improvement is suspected to be a stress reaction of the neurovegetative

system in the sense of Selye's theory. (41 references)

7939

Whittingham, H. E.

IMPACT OF AIR TRAVEL ON EPIDEMIOLOGY.—*Brit. Jour. Clinical Practice* (London), 11 (6): 408-415. June 1957. DLC (R11.M884, v. 11)

The following factors involved in the impact of air travel on the spreading of infectious diseases are discussed: (1) diseases of man, (2) human carriers of disease, (3) insect and rodent vectors of human disease, and (4) animal diseases and agricultural pests. Preventive measures taken against all of these factors are described which have been adequate to prevent any epidemic spread of infectious diseases by air traffic.

7940

Wulfften Palthe, P. M. van

PRIMOVACCINATION AND ELECTRO-ENCEPHALOGRAPHIC PATTERN.—*Aeromedica acta* (Soesterberg, Netherlands), 5: 309-319. 1956/57. In English. DNLM

Electroencephalographic patterns were studied in 40 naval ratings before smallpox vaccination, 1-3 weeks after vaccination, and 4-6 months after vaccination. EEG technique included standard electrode placements, a routine initial EEG, standard hyperventilation test, intermittent photostimulation, and a glucose stress test. Approximately two weeks after primovaccination there was a significant increase in amplitude of alpha activity in the basic rhythm. Six months later it had disappeared. Reaction to hyperventilation was similar: an increase of alpha accentuation, and of slow, high waves (delta activity), which had almost disappeared by the end of six months. In view of the temporary autonomic lability noted in some individuals, the author recommends no flying duty for three weeks after vaccination.

9. TOXICOLOGY

a. General

7941

deTreville, R. T. P.
NOXIOUS VAPORS AND CHEMICAL TRAUMA IN
AIRCRAFT OPERATIONS AND ACCIDENTS.—*Amer.*
Jour. Surg., 93 (4): 724-726. April 1957.

Toxicologic factors in aircraft operations and accidents are discussed as they relate to the following three areas: (1) the nature of the human organism and its reaction to various toxic agents, (2) the composition of the environment (or, in this case, the aircraft and upper atmosphere) under ordinary and emergency conditions, and (3) capabilities and limitations in the field of measurement of the environment and levels of toxic materials in body tissues. Much progress has been made in these fields. A continual control is being exercised by a team composed of representatives of many different scientific fields—physicians, chemists, and engineers who advise regarding human tolerances, and design engineers who determine the most efficient means of controlling the environment without compromising the operational mission.

7942

Jennings, B. H.
HAZARDOUS VAPORS AND DUSTS IN INDUSTRY.—
[343] p. Illinois: Ventilating & Air Conditioning
Contractors Assoc. of Chicago, 1957.

DLC (RA1211.J4)

This book is concerned with the hazards associated with the use in industrial operations of organic and inorganic chemicals and metals. An index is provided of various compounds, including asphyxiant gases, benzene, butane, carbon dioxide, carbon monoxide, air contaminants, gasoline, kerosene, petroleum, and tetrafluoroethylene. Discussion is divided into 5 parts: (1) hazardous materials and their physiological action, (2) principles of supply and exhaust ventilation, (3) threshold limit values, (4) characteristics of individual gases, vapors and dusts, and (5) conversion factors.

7943

Shelanski, M. V.,
and K. L. Gabriel
CUTANEOUS TOXICITY EVALUATION OF AIR
FORCE DEVELOPMENT MATERIALS. II.—*Indus-*
trial Biology Research and Testing Labs., Philadel-
phia, Pa. (Contract AF 33(616)-5072); issued by
Wright Air Development Center. Aero Medical Lab.,
Wright-Patterson Air Force Base, Ohio (Project no.
7159, Task no. 71802). WADC Technical Report no.
57-742, Nov. 1957. v+16 p. AD 142 220 PB 131 668

The primary irritant effect and the sensitization index of certain Air Force materials (developmental engine oils, hydraulic fluids, coated rubber sheeting, and chemically impregnated fabrics) were studied via the prophetic patch test on laboratory animals and volunteer human subjects. All of the materials tested were found safe to use in contact with the human skin after the test with the human subjects. The patch test should be used only for the provision of screening information with respect to cutaneous irritation and sensitivity. The recommended procedure to be followed after its administration is discussed.

7944

THRESHOLD LIMIT VALUES FOR 1957.—A.M.A.
Arch. Indus. Health, 16 (3): 261-268. Sept. 1957.
DLC (RC963.A14, v. 16)

Values are tabulated for the maximum average atmospheric concentration of contaminants to which workers may be exposed for an eight-hour working day without injury to health. Included are substances such as benzene, carbon dioxide, carbon monoxide, carbon tetrachloride, gasoline, ozone, trichloroethylene, toxic dusts, fumes, and mists.

b. Fuels and Lubricants

7945

Bourgarel, C.,
A. Achiary, G. Le Mer, and J. Richet
[SAFETY PROBLEMS POSED BY JET PLANES]
Problèmes de protection posés par les avions-
fusées.—*Médecine aéronautique* (Paris), 12(4):
357-365. 1957. In French, with English summary
(p. 365). DLC (TL555.M394, v. 12)

Hazards to personnel handling fuels and combustives of jet planes and rockets are many. For example, furan fuels produce skin irritation upon contact, vertigo, ocular disorders, mydriasis, amaurosis, etc. Toxic reactions from tonka fuels (50% xylydine, 50% triethylamine) are still little known, but experiments have shown cutaneous reactions. The combustible nitric acid is more dangerous in the liquid form than in the gaseous form. Once on the skin it causes severe burns with clinical, humoral, urinary, blood, and vascular syndromes. Therapy for the injuries caused by these chemicals is outlined, and preventive measures are set forth about storage, refueling, testing, take-offs, landings, and crashes.

7946

Leeuwe, H.
[TOXICITY OF FUELS USED IN AIRCRAFT:
CRITICAL EVALUATION AND ANALYSIS OF THE
LITERATURE] Giftigheid van in vliegtuigen
gebruikte bedrijfstoelstoffen (Kritische bewerking en
analyse der literatuur).—*Aeromedica acta* (Soester-
berg, Netherlands), 5: 9-195. "1956/57". In Dutch,
with English summary (p. 163-187). DNLN

A detailed description is given of symptoms characteristic of acute and/or chronic intoxication with various toxic substances in the aircraft (gasoline, benzene, toluene, xylene, isopropyl ether, ethyl benzene, aliphates, tetraethyl lead, lubricating oils, hydraulic oils, and fire extinguisher compounds); the treatment to be administered in each case; maximum allowable concentrations in the air; and the degree of saturation reached before the onset of symptoms. (226 references)

7947

Lombardi, A. R.,
and A. S. Lurie
HEALTH HAZARDS ENCOUNTERED IN REPAIR
OF JET AIRCRAFT FUEL CELLS.—*Jour. Amer.*
Med. Assoc., 164 (5): 531-533. June 1, 1957.
DLC (R15.A48, v. 164)

Twelve airmen were examined in order to re-

view and evaluate the dangers that could result from acute and chronic exposure to aviation jet fuels. It was noted that occasional central nervous system reactions occurred among the men who did not wear a protective mask. All physical examinations and laboratory studies were within normal limits. The findings in the 12 men included in this study cannot be considered statistically significant on the basis of the evidence presented. Certain safety measures should always be followed by personnel engaged in this type of work. (Authors' summary)

c. Paints, Solvents, etc.

7948

Cohen, M. M.

CENTRAL NERVOUS SYSTEM IN CARBON TETRACHLORIDE INTOXICATION.—*Neurology*, 7 (4): 238-244. April 1957. DLC (RC321.A47)

Two cases of carbon tetrachloride poisoning are presented and the principal neuropathologic alterations are reviewed. Review of the literature, together with consideration of these findings, indicates that the variable neural changes in carbon tetrachloride poisoning result from multiple factors. These include: (1) direct neurotoxic effect, (2) synergistic activity with other compounds, especially ethyl alcohol, (3) hepatic and renal damage due to the solvent itself, (4) cerebrovascular involvement, (5) pre-existing or concomitant cerebral or extracerebral disease. (Author's summary, modified) (23 references)

7949

Kosik, I. V.

[SANITARY CONDITIONS AT WORK WITH DICHLOROETHANE IN THE AIRCRAFT INDUSTRY] Vo-prosy gigeny truda pri primenenii dichloretana v aviatsionnoi promyshlennosti. — *Gigiena truda i professional'nye zabolovaniia* (Moskva), 1 (1): 31-38. Jan.-Feb. 1957. In Russian. DNLM

It was shown that the concentration of dichloroethane in an aircraft factory during a given working shift was 0.05 mg./l. or less for 70-75% of the time, and 0.08-0.15 mg./l. for the remaining time. The effects of dichloroethane vapors in the inhaled air upon the workers were measured by testing visual acuity before and after the working day for 14 days. The results were as follows: 4 of 10 mechanics, and 15 of 17 rubber factory workers showed performance deterioration. Other clinical symptoms and side effects were evident in cerebrocortical disturbances, decreased motor activity, liver and biliary diseases, struma and hyperthyreosis, neurotic conditions, asthenia, neuromyalgia, myofasciculitis, and others. Rats exposed to 0.01-0.5 mg./l. of dichloroethane for 4 hours daily during a six-month period did survive, but reversible changes occurred in neuromuscular functions, and disturbances of conditioned reflexes were observed.

7950

Navrotskii, V. K.

[THE ROLE OF INDUSTRIAL ENVIRONMENT UPON IMMUNOBIOLOGICAL REACTIVITY OF THE ORGANISM] Rol' faktorov vneshnei proizvodstvennoi sredy v immunobiologicheskoi reaktivnosti organizma. — *Gigiena truda i professional'nye zabolovaniia* (Moskva), 1 (2): 12-18. March-April 1957. In Russian. DNLM

Administration of benzol to rabbits immunized by typhoid vaccine did not affect the erythrocyte count (RBC), but decreased the leukocyte count (WBC) from 7,730 to 5,400 after 10 months. Simultaneous administration of benzol and immunization decreased RBC, WBC, and hemoglobin (HG) (after 9 months). Administration of aniline with or without immunization decreased all three, after 8-9 months. Nitrobenzol produced no changes in the RBC but increased the WBC (after 6 months). Both benzol and aniline decreased agglutination titers, which may be indicative of a decrease of immunity. In the intoxications with the above agents the administration of acetylcholine in small doses increased titer values, while larger doses decreased them. Epinephrine had no effect upon agglutination titers.

7951

Tecka, R.

[THE EFFECTS OF CARBON TETRACHLORIDE ON THE HEMOPOIETIC FUNCTION OF THE BONE MARROW] Wpływ cterochloru węgla na układ krwiotwórczy szpiku. — *Acta physiologica polonica* (Warszawa), 8 (3-3a): 548-549. 1957. In Polish. DLC (QP1.A27, v. 8)

Acute intoxication of rabbits with CCl_4 vapors did not alter the hematopoietic activity of the bone marrow, and decreased the body weight at an average of 180 g. Chronic poisoning produced a decrease of body weight at an average of 217 g., a decrease of hematopoietic activity of the bone marrow (decrease of blastocytes).

7952

Vedel, R.

[A DIFFICULT ETIOLOGICAL DIAGNOSIS: POSSIBILITY OF CARBON TETRACHLORIDE POISONING] Un diagnostic étiologique difficile: possibilité d'intoxication par le tétrachlorure de carbone. — *Médecine aéronautique* (Paris), 12 (4): 367-370. 1957. In French, with English summary (p. 370). DLC (TL555.M394, v. 12)

A case is reported of probable carbon tetrachloride poisoning of a warrant officer attached to an air force base. Due to various previous diseases it was difficult to ascertain the etiology of the present disorder which took the form of hepatonephritis. The persistence of anuria rendered his condition serious. The hazards of carbon tetrachloride are emphasized, and precautions to be taken in handling the product are mentioned.

d. Organic and Technological Waste Products (Including CO and CO₂)

7953

Bauer, Miroslav

[PROTECTION AGAINST CARBON MONOXIDE] Ochrana proti kyslíčnicku uhelnatému. — *Bezpečnost a hygiena práce* (Praha), 7 (6): 177-178. June 1957. In Czech. DLC (T55.A1B43, v. 7)

A carbon monoxide filter for individual use in enclosed areas is described. Filtration is adequate when the concentration of carbon monoxide does not exceed 2% by volume in the work area. The filter is based on a combination of metallic oxides which oxidize carbon monoxide to carbon dioxide. A drying agent is used to prevent excess water absorption by the oxidizing agent. Efficiency is increased with

increasing temperature, and the maximum life of the filter is about 130 minutes of continuous operation.

7954

Bosaeus, E.,
and L. Friberg
CARBON MONOXIDE UPTAKE IN MAN DURING
REST AND WORK.—*Acta physiologica scandinavica*
(Stockholm), 39 (2-3): 176-187. 1957.

Ten resting subjects (5 nonsmokers and 5 smokers) were exposed to 0.010, 0.023, 0.040, and 0.080 vol. % CO. The work studies were made on 5 nonsmokers. They breathed 0.023 and 0.040 vol. % CO at rest and during work (bicycle ergometer) corresponding to 300, 600, and 900 kg. per min. Smokers showed COHb on average about 1 to 2% higher than nonsmokers. The maximum individual spread between the subjects was as a rule 5% COHb. This was partly attributable to variations in COHb before the experimental exposure and partly to random factors and individual systemic factors. The individual spread could not be statistically correlated to differences in exposure, ventilation, or O₂ consumption. (From the authors' summary)

7955

Brodie, D. A.
and D. M. Woodbury
ACID-BASE CHANGES IN BRAIN AND BLOOD OF
RATS EXPOSED TO HIGH CONCENTRATIONS OF
CARBON DIOXIDE.—Univ. of Utah. College of Medicine, Salt Lake City; issued by School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 57-131, Sept. 1957. 5 p. AD 149 039 PB 132 508

Inhalation of 30% CO₂ increased carbonic acid and bicarbonate concentration in plasma and brain cells, and decreased intracellular pH moderately. When the concentration of inhaled CO₂ was increased from 30 to 50% there were a further marked fall in the pH of blood and brain cells, a significant further increase in the amount of carbonic acid in plasma and brain, but no significant further increase in the bicarbonate ion concentration in plasma or brain. On abrupt withdrawal of rats from 50% CO₂, the pH of the blood and the brain moved into the range of the pH of the 30% CO₂ rats; bicarbonate ion concentration fell below control values; but brain bicarbonate ion concentration remained elevated. The possible relations between CO₂-induced acid-base and electrolyte changes and seizures induced by 30% CO₂ and by abrupt withdrawal from 50% CO₂ are discussed. (From the authors' abstract) (34 references)

7956

Brown, E. B.
PLASMA ELECTROLYTE COMPOSITION IN DOGS
BREATHING HIGH CO₂ MIXTURES: SOURCE OF
BICARBONATE DEFICIT IN SEVERE RESPIRATORY
ACIDOSIS.—Univ. of Minnesota, Minneapolis; issued by School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 57-115, June 1957. 7 p. AD 144 588 UNCLASSIFIED

Seven dogs were allowed to breathe 30% CO₂-70% O₂ for two hours followed by 40% CO₂-60% O₂ for an additional two hours. Arterial blood samples were drawn before, at the termination of CO₂ breathing, and 15 minutes following CO₂ breathing. Hemoglobin and pH determinations were made on blood; and sodium, potassium, calcium and magnesium, bicarbonate, chloride, protein, and phosphate determinations were made on plasma. A significant bicarbonate

deficit was calculated to be present in all of the blood samples drawn at the termination of CO₂ breathing. After 15 minutes of air breathing following the CO₂ this deficit was negligible in five of seven experiments. (Author's summary)

7957

Brown, E. B.,
and A. S. Prasad
POSSIBLE ROLE OF PLASMA ULTRAFILTRABLE
CALCIUM CONCENTRATION IN POSTHYPERCAPNIC
VENTRICULAR FIBRILLATION.—Univ. of Minnesota and Veterans Administration Hospital, Minneapolis; issued by School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 57-109, July 1957. 5 p. AD 143 448 PB 132 173

During 4 hours of severe respiratory acidosis produced by inhalation of 30 and 40% CO₂ in dogs, plasma potassium and inorganic phosphate rose, ultrafiltrable calcium first increased then fell below control level, and total calcium increased slightly. Within 5 minutes after returning the animal to air breathing, potassium showed a further sharp increase, ultrafiltrable calcium showed a further decrease, and total calcium and inorganic phosphate showed no change. With the rise in potassium and fall in ultrafiltrable calcium the ultrafiltrable Ca/K ratio fell to less than one-third control value. In vitro experiments on dog blood indicated that ultrafiltrable calcium varies directly with H⁺ concentration, and an increase in inorganic phosphate produces a decrease in ultrafiltrable calcium. (Authors' abstract)

7958

Defares, J. G.
CARBON DIOXIDE TIME COURSE DURING BREATHING OF CO₂-RICH GAS MIXTURES AT CONSTANT VENTILATION. I. A METHODOLOGICAL PROBLEM. II. RESULTS.—Koninklijke Nederlandse akademie van wetenschappen, Proceedings, Series C, 60 (3): 376-400. 1957. In English. DLC (Q57, A561, v. 60)

The question was studied, how the oxygen consumption during the inhalation of a CO₂-free gas mixture could be compared with the oxygen consumption during the breathing of a gas mixture containing CO₂. The method employed is discussed in detail. It was found that, on the average, oxygen consumption decreased by 10-20% during exposure to 8.7% CO₂ of the curarized rabbit subjected to artificial (constant) respiration. Validity of the equation for the operation of the controlled system was tested experimentally. Included are representative calculations, figures, and graphs.

7959

Durante, U.
[DETERMINATIONS OF THE CARBON MONOXIDE CONCENTRATION IN AERONAUTICAL ENVIRONMENTS BY MEANS OF THE DRAEGER 19/31 AND PARALLEL CONCENTRATIONS OF IT IN THE BLOOD OF PERSONNEL] Determinazioni del tasso di CO in ambienti aeronautici a mezzo del Draeger 19/31 e parallele concentrazioni di esso nel sangue del personale.—*Rivista di medicina aeronautica* (Roma), 20 (3): 494-507. July-Sept. 1957. In Italian, with English summary (p. 505). DLC (RC1050.R56, v. 20)

Carbon monoxide levels were determined by means of the Draeger 19/31 apparatus in various aeronautical environments (aircraft, garages, hangars, run-

ways), at different times of the day, during various phases of work activity, and in flight. At the same time, blood carbon monoxide levels were determined in both ground and flying personnel in the examined environments. Blood carbon monoxide concentrations were not found to be of a dangerous level. A periodic check of the environmental level is recommended, rather than tests of human blood.

7960

Dzedzichuk, V. P.

[METHOD OF DETERMINING PETROLEUM AND GASOLINE VAPORS IN AIRPLANES] K voprosu metodiki opredeleniia parov kerosina i benzina v vozdukhie kabin samoletov. — *Gigiena i sanitariia* (Moskva), 22 (5): 88-90. May 1957. In Russian.
DLC (RA421.G5, v. 22)

An apparatus designed by Turkel'taub to calculate the amount of hydrocarbon vapors of oils and fuels in the cockpit of an airplane is discussed. Three measurements are required for each flight, and the apparatus carries them out automatically operating on the principle of interruption of an electric current. The air samples are heated to 900-1000° C., at which temperature all hydrocarbons present will burn. The carbon dioxide formed is titrated and the total amount of hydrocarbon vapors calculated.

7961

Furlong, N. B.

A DISPOSABLE ANALYZER FOR SEMIQUANTITATIVE DETERMINATION OF CARBON MONOXIDE IN BLOOD.—Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio (Project no. 7159, Task no. 71803). WADC Technical Report no. 57-604, Sept. 1957. iii+5 p. AD 142 013
PB 135 883

A disposable blood-carbon monoxide analyzer with which it is possible to make relatively accurate measurements has been developed. Use of this device requires no additional apparatus or training. The analyzer is described; and the method of operation is presented. (Author's abstract)

7962

Furlong, N. B.,

and M. J. Schwarz

ENVIRONMENTALLY INDUCED CHANGES IN CEREBRAL OXYGEN AVAILABILITY [Abstract]. — *Federation Proceedings*, 16 (1, part 1): 42. March 1957. DLC (QH301.F37, v. 16)

Permanent implantation of platinum electrodes in brain tissue of the cat has enabled polarographic measurement of oxygen availability in a variety of environmental circumstances. The marked increase in oxygen availability produced by 5-15% carbon dioxide was confirmed at low and high ambient oxygen pressures as well as normal pressure. The oxygen blocking effects of cyanide and carbon monoxide were compared. (Authors' abstract)

7963

Hayden, R.,

and E. B. Brown

INFLUENCE OF DIAMOX ON POSTHYPERCAPNIC SEQUELAE.—Univ. of Minnesota, Minneapolis; issued by School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 57-38, March 1957. 3 p. AD 136 183
PB 129 392

Diamox in a dose of 50 mg./kg. body weight completely prevented the cardiac irregularities regularly observed in dogs following 4 hours of breathing high carbon dioxide mixtures. Only 1 dog of 4 showed cardiac arrhythmias. None of the 9 dogs died, whereas 80% of untreated dogs on this same procedure died with ventricular fibrillation. Diamox-treated dogs suddenly changed from breathing 30% CO₂ to 100% oxygen demonstrated a marked reduction in the rate of rise of blood pH. Plasma potassium concentration rose during the 4 hours of hypercapnia and showed a slight additional rise during the first 5 minutes of air breathing. This secondary rise was not as great as that observed in untreated animals. It is suggested that the rapid change in hydrogen ion concentration per se in the extracellular fluid may play an etiologic role in the posthypercapnic cardiac response, in addition to any other electrolyte changes that occur. (Authors' summary, modified)

7964

McArdle, L.,

I. C. Roddie, J. T. Shepherd, and R. F. Whelan
THE EFFECT OF INHALATION OF 30% CARBON DIOXIDE ON THE PERIPHERAL CIRCULATION OF THE HUMAN SUBJECT.—*Brit. Jour. Pharmacol. and Chemother.* (London), 12 (5): 293-296. Sept. 1957. DNLM

Inhalation of 30% carbon dioxide for 1 to 2 minutes caused a transient increase followed by a marked fall in blood flow through the normal forearm and calf. Since there was an associated large increase in arterial blood pressure, the fall in flow was due to intense vasoconstriction. It is likely that the vasoconstriction in the forearm occurred deep to the skin because the oxygen saturation of the superficial venous blood did not fall during the inhalation. Since there was a slight decrease in flow through the nerve-blocked forearm in spite of the increased blood pressure, it is unlikely that nervous vasoconstriction can completely account for the marked decrease in muscle flow. (Authors' abstract)

7965

Nichols, G.,

K. E. Schaefer, and C. R. Carey
THE EFFECT OF PROLONGED EXPOSURE TO LOW CARBON DIOXIDE CONCENTRATIONS ON ACID BASE BALANCE AND ELECTROLYTES IN BLOOD AND URINE.—Naval Medical Research Lab., New London, Conn. (Project no. NM 24 01 20, Subtask 1). Report no. 1. Report no. 292 (vol. 16, no. 14), Dec. 2, 1957. 10 p. UNCLASSIFIED

In a study of the effect of prolonged exposure to low concentrations of carbon dioxide on acid balance regulatory mechanisms and electrolyte shifts, twenty subjects were exposed to 1.5 per cent carbon dioxide for 42 days. This exposure resulted in a slight uncompensated respiratory acidosis which lasted for 23 days and was followed by compensatory respiratory acidosis. The red cells exhibited an increased sodium content and commensurately decreased potassium content during exposure to CO₂ and during nine days of recovery on air. Caloric intake decreased during exposure. Sodium balance studies showed a bi-phasic pattern, retention during the phase of uncompensated respiratory acidosis, followed by an increased excretion during the phase of compensated respiratory acidosis and during the nine-day recovery period on air. The potassium balance, however, remained essentially unchanged and exhibited only an

adjustment of the excretion to the reduced intake. Some of the studied functions related to acid-base regulation returned to their initial states after a five day recovery period on air, some required eight or nine days; however, even after four weeks of recovery time, the red cells were still dehydrated and a number of electrolyte shifts between the red cell plasma system had not returned to normal. (Author's abstract)

7966

Pelnár, R.

[ON THE DANGER OF CARBON MONOXIDE]

O nebezpečí kyslíčků uhelnatého. — Bezpečnost a hygiena práce (Praha), 7 (3): 79-82. March 1957. In Czech. DLC (T55.A1B43, v. 7)

A review is presented of the chemical and physiological properties of carbon monoxide as they relate to dangers to health. It is reported that even relatively small amounts of carbon monoxide (2-3 milligrams/liter) have caused death. The levels of carboxyhemoglobin in the blood are related to various symptoms, and different treatments for poisoning are given. Treatment includes oxygen inhalation, whole-body irradiation by quartz lamp, methylene blue injections, and subcutaneous injection of lobelin-hexeton.

7967

Soboleva, V. I.

[RESTORATION OF VITAL PROCESSES IN ACUTE POISONING WITH CARBON MONOXIDE] Vosstanovlenie zhiznennykh funktsii organizma pri ostrom otravlenii okis'iu ugleroda. — Patologicheskaya fiziologiya i eksperimental'naya terapiya (Moskva), 1 (1): 12-19. Jan.-Feb. 1957. In Russian, with English summary (p. 18-19). DLC (RB1.P66, v. 1)

Resuscitation from clinical death lasting 4.5-12 minutes (induced by breathing air containing carbon monoxide in concentrations of 0.17-0.25% for up to 5 hours) by blood transfusion, artificial respiration, etc., temporarily restored cardiac and respiratory functions in dogs. Life could be maintained up to three minutes in the anoxic states and at a blood pressure of 60 mm. The length of exposure and the amount of carboxyhemoglobin did not always determine the severity of poisoning, while the degree and the duration of anoxia was of more prognostic significance. In the absence of cerebral damage life can be saved.

7968

Stupfel, M.,

P. Servant, and J. M. Jouany

[THE EFFECT OF CARBON DIOXIDE GAS ON THE NON-ANESTHETIZED RAT PLACED IN A WARM ENVIRONMENT] Action du gaz carbonique sur le rat non anesthésié, placé dans une ambiance chaude. — Comptes rendus de la Société de biologie (Paris), 151 (7): 1337-1341. July 13, 1957. In French. DLC (QP1.S7, v. 151)

Rats were exposed to temperatures of 38°-42° C. at carbon dioxide levels varying from 0 to 50%. The maximum increase in respiratory frequency was observed at about 10% carbon dioxide content, and was significantly higher at 40° C. than at the 25° C. level of the controls. Elevated levels of carbon dioxide were not readily tolerated at high temperatures, and mortality rates increased significantly at high temperatures and high carbon dioxide levels. It was also observed that carbon dioxide content of the blood in-

creased at 39° C. with levels of carbon dioxide above 26%. The observed hyperthermia in the rats was thought to be due to an inhibition of sweating by the hypercarboxia.

7969

Stupfel, M.,

P. Servant, and J. M. Jouany

[EFFECT OF CARBON DIOXIDE ON THE NON-ANESTHETIZED RAT: THERMAL, RESPIRATORY, METABOLIC MODIFICATIONS, AND RECOVERY] Action du gaz carbonique sur le rat non anesthésié: modifications thermiques, respiratoires, métaboliques et récupération. — Comptes rendus de la Société de biologie (Paris), 151 (1): 874-878. Dec. 21, 1957. In French. DLC (QP1.S7, v. 151)

An atmosphere containing 30% carbon dioxide had a marked narcotic effect on the rat, and a concentration of 40% proved to be lethal. Respiratory rhythm was greatly accelerated with increasing carbon dioxide concentration, and oxygen consumption was reduced. Anesthesia due to cold (lowering of the rectal temperature by 4° C. in one hour when the carbon dioxide concentration was 40%) was too slight to explain the degree of immobility obtained. Recovery of the animals was normal upon return to normal environmental conditions.

7970

Stupfel, M.,

J. M. Jouany, and C. Jaulmes

[THE EFFECT OF CARBON DIOXIDE ON THE THERMOREGULATION OF THE UNANESTHETIZED RAT] Action du gaz carbonique sur la thermorégulation du rat non anesthésié. — Comptes rendus de la Société de biologie (Paris), 151 (12): 2045-2049. Dec. 14, 1957. In French. DLC (QP1.S7, v. 151)

The deep colonic temperature of rats placed in a water-saturated atmosphere varied about 1° C. at external temperatures between 5° and 31° C. Beyond 31° hyperthermia developed and was rapidly fatal. In the same conditions and in the presence of 10% carbon dioxide the thermoregulation of the rat was inoperative, and the rat became a veritable poikilotherm. The internal temperature followed the variations in the ambient temperature. At a temperature near 29° C. the rat maintained a fixed internal temperature under carbon dioxide. This point must correspond to the "thermal neutrality" which has been described previously. Below this temperature reversible hypothermia is present. Above it hyperthermia develops and is quickly fatal in the neighborhood of 43° C. (Authors' conclusions)

7971

Tamas, A.,

and J. McElroy

POSTMORTEM CARBON MONOXIDE ANALYSIS: SIGNIFICANCE OF TISSUE BLOOD CONTENT. — Wright Air Development Center, Aero Medical Lab., Wright-Patterson Air Force Base, Ohio (Project no. 7159, Task no. 71803). WADC Technical Report no. 57-686, Nov. 1957. iii+15 p. AD 142 150 PB 131 725

Proper interpretation of the results of a post-mortem tissue analysis for carbon monoxide is essential to the Flight Surgeon investigating major aircraft accidents. The pitfalls and shortcomings of the present technique of extrapolating presumed human in vivo blood carbon monoxide levels from data obtained by rat experimentation are described.

Data are presented which indicate the necessity for relating carbon monoxide tissue analyses to the tissue blood content. (Authors' abstract)

7972

Thompson, A.,
and E. B. Brown
TISSUE CARBON DIOXIDE CONCENTRATIONS IN HYPERCAPNIC RATS.—School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 58-11, Dec. 1957. 5 p. AD 158 554 PB 134 374

Tissue carbon dioxide concentrations were measured in rats following exposure of the intact animals to 10 or 30% CO₂ in oxygen for various time intervals. In these experiments the average normal CO₂ concentrations in skeletal muscle, heart, and brain were 13.2, 18.6, and 15.1 mM./kg. of wet tissue respectively. After about 5 minutes on 30% CO₂ or 10 minutes on 10% CO₂ the skeletal muscle concentrations consistently exceeded the normal range. In all three tissues CO₂ concentrations were approximately doubled after 35 minutes on 30% CO₂. On this mixture the muscle CO₂ content continued to rise slightly after 1 hour. The effects of postmortem delay in analysis are given. The barium-soluble fraction of tissue CO₂, about 60% of the total, showed great individual variations and no significant change on high CO₂. (Authors' abstract)

7973

Tiunov, L. A.,
T. I. Sokolova, and V. P. Paribok
[THE DURATION OF ELIMINATION OF CARBON MONOXIDE FROM THE BODY] K voprosu o dlitel'nosti vydeleniia okisi ugleroda iz organizma.—Farmakologiya i toksikologiya (Moskva), 20 (4): 76-78. July-Aug. 1957. In Russian, with English summary (p. 78). DLC (RS1.F25, v. 20)

The rate of CO elimination from the body and its retention in the tissues were studied by exposing cats to radioactive carbon monoxide (C¹⁴O) in a poison chamber or in some experiments injecting blood containing radioactive CO directly into the blood stream. The level of radioactivity was measured in the blood and in minced organ tissues after elimination of C¹⁴O from the blood had stopped. Although there was considerable variation in the time needed for elimination of C¹⁴O from the blood, almost complete elimination was achieved after 7 hours even if the exposure to carbon monoxide had been as long as 49 hours. Examination of tissue from various organs revealed a very slight amount of carbon monoxide retained after its elimination from the blood.

e. Other Substances

7974

Berry, L. J.
ARSENITE POISONING IN NORMAL AND IN ALTITUDE-ACCLIMATIZED MICE.—Bryn Mawr Coll., Pa.; issued by School of Aviation Medicine, Randolph Air Force Base, Tex. Report no. 56-117, Feb. 1957. 6 p. AD 140 628 UNCLASSIFIED

Mice exposed to a simulated altitude (20,000 feet) for three weeks are more susceptible to arsenite poisoning than normal control (sea-level) mice. An analysis of selected tissues from both groups of poisoned animals reveals that a differential change in citrate concentration and in alpha-ketoglutaric acid

concentration occurs in certain of these tissues. There is no difference, however, in pyruvic acid content of tissues from the two groups of arsenite-poisoned mice. These results do not explain the greater susceptibility of altitude mice to arsenite but they point to an altered metabolism as part of the adaptive syndrome to hypoxia. Blood sugar concentration and muscle (diaphragm) glycogen are both lower in altitude mice, compared to those of normal control animals, but liver glycogen is unaltered. (Author's abstract)

7975

Clamann, H. G.,
and R. W. Bancroft
PHYSIOLOGICAL EFFECTS OF OZONE [Abstract].—Federation Proceedings, 16 (1, part 1): 22. March 1957. DLC (QH301.F37, v. 16)

Studies on five human subjects showed great differences in individual sensitivity to ozone exposure. Irritation of the respiratory tract was observed at concentrations as low as 0.6 parts per million after 30 minutes. Gross changes of respiratory function (reduction of vital capacity in more than 50%, pulmonary edema) occurred after one hour at 6 p.p.m. The soft tissues of the respiratory tract seem to be the only tissues attacked by ozone. The sense of smell is definitely affected. An effect on the conjunctiva of the eye was neither felt nor observed by inspection. No effects upon blood and circulatory system were found. (Authors' abstract)

7976

Griswold, S. S.,
L. A. Chambers, and H. L. Motley
REPORT OF A CASE OF EXPOSURE TO HIGH OZONE CONCENTRATIONS FOR TWO HOURS.—A. M. A. Arch. Indus. Health, 15 (2): 108-110. Feb. 1957. DLC (RC963.A14, v. 15)

A subject spent two hours in an outdoor fumigation chamber exposed to ozone, 2 parts per million. Subjectively, there was found throat and mouth dryness, lessening of mental ability to concentrate and absorb thought, substernal chest pains of a constrictive character, and continual odor; however, there was a lack of eye irritation and nausea. Comparison of spiograms before and after exposure revealed a 13% reduction in total vital capacity after ozone exposure, but after 22 hours this value returned to normal. Reductions were also found in the timed vital capacity and in the maximum breathing capacity. The spiogram tracings showed prolongation of exhalation immediately after the test exposure, and also after 22 hours slight evidence of air trapping.

7977

Klen, G. A.,
N. Lasker, and T. R. Sherrod
ACTION OF CIGARETTE SMOKE ON CARDIOVASCULAR HEMODYNAMICS [Abstract].—Federation Proceedings, 16 (1, part 1): 312. March 1957. DLC (QH301.F37, v. 16)

Immediately following the administration of 1200-1500 cc. of "king-size" nonfiltered cigarette smoke to the open-chest pentobarbitalized dog, a brief but marked slowing of the heart followed by a sustained pressor response was observed. These effects were attributed to autonomic ganglionic stimulation by the absorbed nicotine from the cigarette smoke. The coronary arteriovenous oxygen difference showed at

first a marked decrease followed by a prolonged increase. As a consequence, initially the cardiac oxygen utilization was reduced during the period of a greatly elevated cardiac work, followed by a sustained increase. These alterations may be explained on the basis of metabolic changes in the myocardium. That such effects are detrimental to adequate cardiac function is suggested by the extreme electrocardiographic alterations incident to the changes in oxygen utilization during the period of elevated cardiac work. (Authors' abstract, modified)

7978

Kratochvil, C. H.,
S. S. Wilks, and W. A. Gerrard
CIGARETTE SMOKING AT ALTITUDE [Abstract].
— Federation Proceedings, 16 (1, part I): 75.
March 1957. DLC (QH301.F37, v. 16)

Blood carbon monoxide was measured in a group at ground level before and after smoking one cigarette and again at 18,000 feet (altitude chamber) before and after smoking one cigarette. In the second group, performance on the SAM complex coordinator was measured at ground level, at 18,000 feet and at 18,000 feet while smoking. The results indicated that there was no increase in blood CO at altitude as compared with ground level controls after one cigarette. Similarly, there was only a slight decrement in performance when smoking while hypoxic at altitude was compared with the hypoxic controls. The primary physiological hazard in smoking at altitude appears to be hypoxia. There is little exaggeration of the effect from cigarette smoking beyond that caused by the usual amount of carboxyhemoglobin formed. (Authors' abstract, modified)

7979

Langen, C. D. De
[THE EFFECT OF SMOKING ON THE BLOOD PRESSURE DIAGRAM] Het bloeddrukdiagram onder invloed van het roken.—Aeromedica acta (Soesterberg, Netherlands), 5: 347-353. 1956/57. In Dutch.

DNLM

Blood pressure and pulse rate were determined before smoking with the subject in a standing position, during rapid smoking of a cigarette (5 min.), and for fifteen minutes afterward. In most subjects the diagram showed blood pressure changes indicative of specific types of circulatory disturbance. Repetition of the experiment with the subject lying down showed little or no deviation from the normal diagram. Of twelve habitual smokers, two showed no blood pressure changes, six felt faint, and four had blood pressure diagrams indicative of a pre-collapse state. The systolic pressure in these conditions increased while the diastolic either fell or remained stationary. These changes are thought to be due to release of pitressin: secondary to the vasomotor effects of smoking.

7980

Malmejac, J.
[ON THE DANGERS OF ALCOHOL FOR AERONAUTICAL ENVIRONMENTS] Sur la nocivité de l'alcool pour les milieux aéronautiques.—Médecine aéronautique (Paris), 12 (4): 313-338. 1957. In French, with English summary (p. 338).

DLC (TL555.M394, v. 12)

For pilots, alcohol ingestion decreases the resistance to anoxia at altitude, changes mental balance,

and deteriorates their psychosensory and psychomotor reactions. These alterations, although small, decrease the aptitudes which are indispensable for piloting, or the performance of various activities by flying personnel. Airmen are cautioned to refrain from drinking alcoholic beverages, especially during the hours preceding a flight mission. The ingestion of fruit juices rich in hydrosoluble vitamins (vitamin C especially) exerts a favorable effect on work and can replace alcoholic beverages in quenching thirst.

7981

Matzen, R. N.
DEVELOPMENT OF TOLERANCE TO OZONE IN REFERENCE TO PULMONARY EDEMA.—Amer. Jour. Physiol., 190 (1): 84-88. July 1957.
DCL (QP1.A5, v. 190)

Mice were pre-exposed to various concentrations of ozone for 4-hour periods and then exposed a second time to a lethal or greater dose. Controls were not pre-exposed. The amount of edema as well as the mortality rate was then measured. No animal pre-exposed to 1.9 p.p.m. O₃ or above died following another exposure at the lethal concentration of 8.6 p.p.m. O₃, and edema was generally prevented. Pre-exposure conferred tolerance at levels as high as 19.2 p.p.m. O₃, and maintained this tolerance for as long as 102 days after exposure. It is suggested that the tolerance is an immunity reaction. O₃ could possibly react with protein forming a foreign protein which in turn causes an antibody production.

7982

Mittler, S.
TOXICITY OF OZONE. III. CHRONIC TOXICITY.
—A. M. A. Arch. Indus. Health, 15 (3): 191-197.
March 1957. DLC (RC963.A14, v. 15)

Repeated exposures to 2.4 parts per million of ozone induced some hemorrhage and edema in the lungs of rats. Adaptation to ozone was noted after 32 hours of accumulative exposure. Twenty per cent of 102 mice died after a continual exposure to 2.4 p.p.m. of ozone for 241 hours. Chronic exposure to ozone decreased the weight gain by young rats, and concentrations greater than 1.2 p.p.m. and longer than seven hours per day significantly affected the growth of young rats. The 0.1 p.p.m. value as the maximum allowable concentration of ozone for an eight-hour workday appears to be reasonable. Ozone did not reach or react with the blood of chronically exposed animals. There was no change in hematocrit or hemoglobin values. (Author's summary)

7983

Stokinger, H. E.
EVALUATION OF THE HAZARDS OF OZONE AND OXIDES OF NITROGEN.—A. M. A. Arch. Indus. Health, 15 (2): 181-190; (3): 181-190. March 1957.
DLC (RC963.A14, v. 15)

Experimental evidence is presented that ozone in single acute exposure is a highly poisonous substance to laboratory animals. No experimental evidence was found that this toxicity is modified to a significant degree by the presence of nitrogen oxides that may accompany ozone production. Seven factors were experimentally found that may modify the toxicity of ozone. Four of these, youth, physical exertion, alcohol, and respiratory infection, tend to augment the injurious response or act to the detriment of the host; the remainder, intermittent exposure, premedication, and preexposure either reduce

or eliminate the injurious effects of ozone. (From the author's summary and conclusions)

7984

Svirbely, J. L.,
and B. E. Saltzman

OZONE TOXICITY AND SUBSTANCES ASSOCIATED
WITH ITS PRODUCTION.—A. M. A. Arch. Indus.
Health, 15 (2): 111-118. Feb. 1957.

DLC (RC963.A14, v. 15)

The data obtained from acute inhalation studies indicate that ozone per se is a highly toxic substance (causing respiratory distress, transient convulsive seizures, dyspnea, coma, mortality) to rats, mice, and hamsters. The ozone used in these exposures was generated from various gas mixtures and with two different ozonizers varying in current density. The injurious effects of ozone appear to be lessened by a previous exposure to relatively low concentrations of ozone for a short period. This tolerance was apparent for at least four and one-half weeks after exposure. (Authors' summary, modified)

7985

Stokinger, H. E.,

W. D. Wagner, and O. J. Dobrogorski

OZONE TOXICITY STUDIES. III. CHRONIC INJURY
TO LUNGS OF ANIMALS FOLLOWING EXPOSURE
AT A LOW LEVEL.—A.M.A. Arch. Indus. Health,
16 (6): 514-522. Dec. 1957. DLC (RC963.A14, v. 16)

Laboratory animals (mouse, hamster, rat, guinea pig, dog) were exposed to ozone for six hours daily, approximately five days each week for 268 exposures during a calendar period of 433 days. Chronic in-

jury resulted in the lungs of small animals following repeated inhalation, which was characterized pathologically as chronic bronchitis and bronchiolitis. The dog showed none of the deep lung changes seen in smaller animals but only mild irritation of the trachea and major bronchi. Man's relative position in the range of pulmonary response to ozone was estimated to be between that of the dog and the smaller animals, on the basis of calculations involving dimensions of the trachea, large air passages, and ventilation rates, and assuming equal cellular susceptibility of man and dog. Reference made to man's response to low-grade ozone exposures further substantiates this position. Statistical evidence is given that rigorous control of the exposure concentration was maintained at 1.0 ± 0.25 parts per million by volume as determined by the alkaline potassium iodide method. (Authors' summary, modified)

7986

VOLUNTEERS BREATHE OZONE MIX FOR TEST.—
Aviation Week, 66 (3): 59-60. Jan. 21, 1957.

DLC (TL501.A8, v. 66)

Effects of voluntary breathing of controlled concentrations of ozone are presented. These effects are of interest because ozone is present in lethal quantities in the ionosphere now being approached by high performance aircraft. They include swelling of the lung tissue apparently beginning at concentrations of 4 or 5 p.p.m., impairment of the sense of smell, and individually varying symptoms such as burning in the throat, feeling of oppression of the chest, and difficulty in breathing. No burning of the eyes was observed and no effect could be found on blood pressure, pulse rate, or blood chemistry.

10. SAFETY, SURVIVAL, AND RESCUE

[Evacuation of patients under 8-e]**a. General**

7987

Gleason, T. L.

PASSENGER PHYSIOLOGICAL TRAINING IN RELATION TO USAF JET AIRCRAFT ACCIDENTS/ INCIDENTS. PERIOD: 1 JANUARY 1955 THRU 31 DECEMBER 1956.—Directorate of Flight Safety Research, Norton Air Force Base, Calif. Publication no. 23-57, Oct. 29, 1957. i+29 p. AD 153 956 UNCLASSIFIED

An analysis was made of the physiological training received by passengers who were involved in USAF jet aircraft accidents/incidents covering a two year period, 1 January 1955 through 31 December 1956. It was determined that of the 145 passengers so involved 57 were nonrated and the remaining 88 were rated. Of the 88 rated passengers only 34 had records definitely indicating prior physiological training. Six nonrated passengers had definitely received no formal physiological training. There were 17 fatalities and 4 major injuries among the rated passengers. There were 14 fatalities and 3 major injuries among the nonrated passengers. Six rated and 2 nonrated persons died and 1 nonrated person received major injuries as a result of failure to observe in-flight protective and survival procedures as taught in a physiological training program. In order to reduce the physiological hazard to passengers flying in jet aircraft, it was concluded that: (1) the Surgeon General, should re-examine the physiological training program with a view toward increasing its scope and effectiveness; (2) the requirement for physiological training of personnel and subsequent recording of completed training should be rigorously enforced; and (3) the requirement for passenger briefings, particularly on oxygen usage and emergency escape systems should be strictly enforced. (Author's summary)

7988

Hoyt, J. R.

SAFETY AFTER SOLO: HOW TO FLY 10,000 HOURS.—2nd., revised ed. viii+364 p. North Hollywood, Calif.: Pan American Navigation Service, Inc., 1957. DLC (TL710.H67, 1957)

This manual is concerned with pilot safety during the entire flying career. It attempts to make the pilot aware of his involvement in a continual learning process, that nobody or nothing stands still in aviation, and that one either grows and learns with experience or else retrogresses. A subject index is included.

7989

Shrader, W. A.,

and R. C. McGuire

AIR SAFETY PROBLEMS.—Aeronaut. Engin. Rev., 16 (3): 42-46, 56. March 1957.

DLC (TL501.A326, v. 16)

A synopsis of the 8th Annual International Seminar of the Flight Safety Foundation, held in Palm Beach, Fla., December 3-7, 1956, is presented. Included among the topics covered were the following: human engineering for semiautomatic ground control, cockpit design, psychological aspects of the jet age, rapid

decompression in large cabin aircraft, potential collisions in transportation, designs for evacuation, crash injury research, passenger crash protection device, and forward vs. rear-facing seats.

b. Protective Equipment and Clothing*[Warning devices under 11-c]*

7990

Alexander, M.,

and H. T. E. Hertzberg

A COMFORT EVALUATION OF A FORM-FITTING HIGH ALTITUDE HELMET.—Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio (Project no. 7214). WADC Technical Report no. 56-404, Feb. 1957. iv+15 p. AD 110 548 PB 130 320

This report describes comfort tests on an experimental pressure helmet assembly, consisting of an outer rigid shell and an inner compressible, form-fitting liner of polyurethane foam. Seventy-two subjects were used, of whom twenty-one were rated military pilots. A number of testing techniques and fabrication requirements for comfort and acceptability are discussed, and their applicability to most forms of headgear, especially those using compressible liner material, is indicated. (Authors' abstract)

7991

Bloom, A.,

and E. L. Michel

THE PROBLEMS OF OXYGEN MASK DEVELOPMENT.—Jour. Aviation Med., 28 (2): 180-184. April 1957. DLC (RC1050.A36 v. 28)

The problems of mask design, valve design, and mask support are described in detail and a new concept in aviators' oxygen-breathing devices is discussed. The improved mask will provide a rigid housing containing the microphone and valving assembly, and a custom-made laminate (seal) attached to the basic housing so that each pilot will be assured of a perfect and comfortable fit. A complete variety of laminates will be made available on the basis of anthropometric studies. (Authors' summary, modified)

7992

CROSSFIELD DRESSES FOR X-15's FIRST FLIGHT.—Amer. Aviation, 21 (15): 28. Dec. 16, 1957.

DLC (TL501.A675, v. 21)

Descriptions are presented of the XMC-2 full-pressure suit to be used by pilot Scott Crossfield during the first flight of the X-15 experimental rocket plane. The suit was developed by the David Clark Co., Inc., Worcester, Mass. It consists of several layers of garments, each offering a special protection against certain hazards. Included are an insulating garment for protection against the extreme cold at high altitudes, a ventilating garment for protection in crew compartments overheated in flight, an inflating garment for protection against low pressure conditions, and an aluminized outer garment for protection against flash fires in the crew compartment and wind after bailout. In addition, the suit includes restraining straps and its own emergency oxygen system.

7993

Emanuel, I.,
and M. Alexander
HEIGHT-WEIGHT SIZING AND FIT-TEST OF A
CUTAWAY G-SUIT, TYPE CSU-3/P.—Wright Air
Development Center. Aero Medical Lab., Wright-
Patterson Air Force Base, Ohio. (Project no. 7214).
WADC Technical Report no. 57-432, July 1957. iv+22
p. AD 130 912 PB 131 451

Body size data from the 1950 Air Force Anthropo-
metric Survey have been reanalyzed to yield a sta-
tistical sizing program based on height and weight.
This six-size program was incorporated into the
Type CSU-3/P Cutaway Anti-g Garment, which was
tested from the standpoint of fit and comfort. Suit
selection was accomplished simply by asking each
subject his height and weight. Of seventy-three sub-
jects fitted, seventy-two were comfortably accommo-
dated by the size indicated by height and weight val-
ues. It is concluded that this sizing procedure will
result in the saving of time and money because of the
ease of fitting, reduction of individualized tailoring
and simplification of procurement. (Authors' ab-
stract)

7994

Finken, W. S.,
and J. A. Aileo
CLOSE-FITTING HELMET.—U. S. Patent 2,810,022.
Oct. 15, 1957. DP

A close-fitting helmet and earphone support
adapted to be worn either alone or under an outer
safety helmet is described and illustrated.

7995

Finken, W. S.
HEADGEAR WITH RETRACTABLE EYE SHIELD.—
U. S. Patent 2,813,271. Nov. 19, 1957. DP

A helmet is described and illustrated with a rigid
outer shell large enough to receive the pilot's head
with substantial clearance. Attached is a retractable
protective eyeshield.

7996

Gabb, J. E.,
and A. S. Lucking
RESPIRATORY MASKS.—U. S. Patent 2,814,293.
Nov. 26, 1957. DP

A respiratory mask comprising a face-piece and
headharness connected by a toggle link is described
and illustrated.

7997

Gourley, N. W.
GENTEX PILOT'S PROTECTIVE HELMET, TYPE
DH5-3; EVALUATION OF.—Marine Corps Develop-
ment Center, Quantico, Va. (Project no. EA-1268).
[Unnumbered Report], Aug 27, 1957. [12]p.
AD 140 141 UNCLASSIFIED

The Gentex Pilot's Protective Helmet, Type
DH-5-3 (test item) for helicopter pilots was found
to be slightly superior to or comparable to the
in-service H-4 helmet as to comfort, fit, ventilation,
chin strap, sound attenuation, stability and radio
reception. Items that require improvement or
modification are the visor (needs protective cover
permanently attached to helmet), improved periph-
eral (side) and vertical (upward) visibility, and
self-locking nuts on the ear cup/headset assembly.
A most desirable feature is the suspension system

which incorporates an adjustable headband and
floating cross-head straps. A requirement does
not exist in Marine aviation for a separate and
distinct helicopter pilots' protective helmet. Future
pilots' protective helmet development should be de-
signed to satisfy the helicopter pilot's needs.
(Author's summary, modified)

7998

Greider, H. R.,
L. J. Santa Maria
SUBJECTIVE THERMAL COMFORT ZONES OF
VENTILATED FULL PRESSURE SUIT AT ALTI-
TUDE.—Jour. Aviation Med., 28 (2): 272-276. June
1957. DLC (RC1050.A36, v. 28)

Fifty two-hour runs were made to determine the
thermal comfort zones of subjects in a full-pressure
suit with a ventilating flow of 140 liters per minute
(standard temperature and pressure) at 18,000
ft. simulated altitude. Ventilating temperatures (t_v),
were 60°, 75°, and 90° F. Ambient temperatures
(t_a), maintained constant during each run, ranged
from 40° F. to 120° F. in increments of 10° F. The
comfort zone, related to t_a , is more extended under
the influence of ventilation than under no ventilation.
Changing t_v from 60° to 90° F. has no significant
effect on total water loss and evaporative water loss,
provided that the subjects are maintained in the same
degree of comfort. The comfortably warm state (t_a
92° to 107° F.) causes a significant increase in water
loss over that found in the comfortable state (t_a 65°
to 92° F.). (Authors' conclusions and summary,
modified)

7999

HELMET VISOR WORN UP IN NORMAL FLIGHT.—
Aviation Week, 67 (13): 87. Sept. 30, 1957.
DLC (TL501.A8, v. 67)

The Taylor pressure suit (developed in coopera-
tion with the Royal Air Force and the Institute of
Aviation Medicine, Farnborough) is described which
permits the face visor to remain open under normal
conditions, eliminating the possibility of fogging and
giving the pilot a sense of freedom. If the cabin
pressure fails, the visor is lowered and locked into
position by the same pressure-sensing system that
operates the pilot's pressure suit. Other features of
the helmet include a hatch at the center bottom for
in-flight feeding and quick release and crash protec-
tion.

8000

Hershkovitz, J.,
and L. M. Levine
ATTENUATION OF EAR PROTECTORS BY LOUD-
NESS BALANCE AND THRESHOLD METHODS.—
Jour. Acoust. Soc. Amer., 29 (8): 889-894. Aug.
1957. DLC (QC221.A4, v. 29)

The attenuations of two earmuffs and two ear-
phone sockets were measured by three methods.
Two of these methods used a loudness-balance
procedure in which the subject, upon removal of
the ear protectors, adjusted the ambient sound
level to match the loudness to that which existed
previously. This procedure was used with half-
octave bands of thermal noise in a diffuse sound
field and also with pure tones in free-field. The
third method was the absolute-threshold-shift
method using pure tones in free field and a clini-
cal audiometric procedure. At the low and high
frequencies, results of the threshold method indi-

cated an average of six decibels greater attenuation than was measured by the loudness-balance thermal-noise diffuse-field method. Since the latter method simulates actual usage more closely than the former, it is recommended that a safety factor be applied to threshold results in estimating the protection afforded in high noise ambients by earmuffs and receiver sockets. (Authors' abstract)

8001

Jackson, M. M.

PASSENGER OXYGEN REQUIREMENTS FOR JET TRANSPORT AIRCRAFT.—Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio (Project no. 7160, Task no. 71811). WADC Technical Report no. 57-183, May 1957. iii+7 p. AD 118 284 UNCLASSIFIED

A guide for computing the total amount of oxygen required for the passengers on military and civilian jet transport aircraft is presented. The oxygen supply requirements based on flight profiles for three oxygen systems, "100% Oxygen", "Normal Oxygen", and "Continuous Flow" are given. Pertinent supplementary data essential for calculating the oxygen requirement figures are included. (Author's abstract)

8002

Kachan, A. A.

[A NEW SENSITIVE INDICATOR OF ULTRAVIOLET RADIATION] Novyi chuvstvitel'nyi indikator ul'tra-fioletovogo izlucheniia. — Gigiena i sanitariia (Moskva), 22 (1): 69-70. Jan. 1957. In Russian. DLC (RA421.G5, v. 22)

Quartz or Stottish glass ampules filled with 0.1 g./liter of methylene blue in 0.3 N H₂SO₄ and 0.2 N HCl with SnCl₂ are used to calculate ultraviolet radiation in the 290-400 mμ range. It becomes insensitive below 280 mμ. Thionine or methylene azure can be used instead of methylene blue. (Author's abstract, modified)

8003

Kawata, S.,

M. Shirakawa, T. Haradh, and Y. Taketomi
EXPERIMENTAL STUDIES OF THE EAR PROTECTIVE EQUIPMENT FOR NOISE: ON THE APPLICATION OF FOAMRUBBER.—Jour. Sci. and Labour (Tokyo), 33 (6): 396-405. June 1957. In Japanese, with English summary (p. 396-397). DNLm

Three samples of foam rubber ear plugs were tested audiometrically for sound attenuation. The sizes of the foam were 0.216 mm. x 0.216 mm., 0.324 mm. x 0.306 mm., and 0.396 mm. x 0.378 mm. in diameter. The diameter of the samples was proportional to the volume of air contained. Sound attenuation was found to be slight for pure tones below 1000 c.p.s. but effective for tones of 2000-5000 c.p.s. Beyond 8000 c.p.s. sound was also reduced considerably. Two plugs which were 20 mm. thick and composed of 4- and 6-inch latex had an effect of sound attenuation of over 30 phon. (Authors' summary, modified)

8004

Kuznetsov, A. G.

[OXYGEN BREATHING UNDER PRESSURE AT HIGH ALTITUDES] Dykhanie kislorodom pod iz-bytochnym davleniem na bol'shykh vysotakh. — Voenno-meditsinskii zhurnal (Moskva), 1957 (2): 70-75. Feb. 1957. In Russian. DLC (RC970.V55, v. 1957)

The role of pressure suits, protective helmets, and automatic oxygen units in the protection of fliers in high altitudes is discussed. Emphasis is placed on the need for specialized training in the handling of oxygen apparatus and in the respiration technique under the conditions of oxygen under pressure.

8005

Lewis, B. M.,

R. E. Forster, and E. L. Beckman

THE EFFECT OF INFLATION OF A PRESSURE SUIT UPON PULMONARY DIFFUSING CAPACITY IN MAN.—Naval Air Development Center. Aviation Medical Acceleration Lab., Johnsville, Pa. (Project no. NM 001 100 314, Report no. 1). Report no. NADC-MA-5705, May 1, 1957. iv+18 p. AD 134 510 UNCLASSIFIED

Measurements were made of the diffusing capacity of the lung for carbon monoxide (D_L) at different alveolar O₂ tensions from below 100 mm. Hg to above 600 mm. Hg in 4 healthy subjects using a 10-second breath-holding technique. Measurements were made when the subjects were wearing a tightly fitting pneumatic suit inflated around the lower half of the body to a pressure of 75 mm.Hg. In none of 11 series of experiments was a significant change in mean D_L produced by inflation of the pneumatic suit. The true diffusing capacity of the pulmonary membrane fell following suit inflation in two subjects and rose in two others, while the volume of blood in the pulmonary capillaries fell in one subject, rose in two subjects, and was unchanged in one subject. These changes were probably not significant. Inflation of the suit produced gas "trapping" in the lung. (Author's abstract, modified)

8006

Libber, L. M.,

H. R. Greider, and L. J. SantaMaria

EFFECTS OF MODERATE HEAT STRESS, ALTITUDE, AND TIME ON THE DEHYDRATION RATE OF SUBJECTS WEARING THE VENTILATED FULL PRESSURE SUIT.—Naval Air Material Center. Air Crew Equipment Lab., Philadelphia, Pa. (Project no. TED NAM AE-5109). Report no. NAMC-ACEL-342, June 11, 1957. v+7 p. AD 135 766 PB 136 003

The effects of altitude, time, and a subjectively designated comfortably warm state on various measures of water loss were studied. Results showed that there was as much as 1,044 grams total weight loss during a four-hour test period. The rate of total weight loss, however, decreased with time. Altitude had little effect on any of the dependent variables. The possible effects of prolonged flights (6 hrs.) in a comfortably warm suit environment with high ventilating air flow are discussed. Under these conditions as much as 4.8% body weight deficit may be incurred. If these conditions are to exist in future aircraft, recommendation is made to incorporate some method of oral inflight fluid intake by the pilot. (From the authors' abstract)

8007

McGinnis, J. M.

EFFECTIVENESS OF PROTOTYPE COLD WEATHER FACE MASKS FOR MILITARY ACTIVITIES.—Quartermaster Research and Engineering Center. Environmental Research Division, Natick, Mass. (Project no. 7-95-20-003). Technical Report no. EP-60, June 1957. vi+46 p. AD 149 222 UNCLASSIFIED

Research was surveyed on protection of the face against cold and wind and the use was studied of two new face masks ("Coldbar" and "Wood-Hafferty") by men engaged in a variety of military activities under severe conditions of windchill. Information was obtained on the need for face protection, military requirements for face masks, desirable and undesirable characteristics of masks studied, their effectiveness under various conditions, and improvements needed. Both masks materially increased the effectiveness and comfort of their wearers. (From the author's abstract)

8008

McGinnis, J. [M.]

QUARTERMASTER HUMAN ENGINEERING HANDBOOK SERIES. V. HANDBOOK OF CRITERIA USED BY TROOPS IN EVALUATING QUARTERMASTER CLOTHING AND PERSONAL EQUIPMENT.—Quartermaster Research and Engineering Center. Environmental Protection Research Div., Natick, Mass. (Project no. 7-83-01-005B). Technical Report no. EP-74, Dec. 1957. iv+41 p. AD 154 689

UNCLASSIFIED

The effects of climate and six important personal variables on the criteria which troops employ most frequently in evaluating 13 selected families of Quartermaster equipment and field and garrison clothing are summarized in condensed tabular form for easy reference. The tables are intended for the use of designers of Quartermaster items and for use in planning future studies of soldier preferences for Quartermaster items. The background leading to the development of the tables is summarized, the tables are described briefly, and directions are given for their use and interpretation. (Author's abstract)

8009

McKee, M. E.

THE EFFECT OF CLOTHING ON THE SPEED OF MOVEMENT IN THE UPPER EXTREMITY.—State Univ. of Iowa, Iowa City (Contract DA-44-109-QM-1760); issued by Quartermaster Research and Engineering Center. Environmental Protection Research Division, Natick, Mass. (Project no. 7-83-01-004A). Technical Report no. EP-48, June 1957. iv+35 p. AD 139 527

UNCLASSIFIED

As part of a larger study of the effect of clothing restriction upon range, speed, and strength of movement, 339 ROTC students were given speed tests of overhead and forward cranking and horizontal striking, with and without an arm and shoulder harness simulating clothing restriction. The results showed performance decrements related to clothing restriction, but these effects appeared to be less important than decrements by warmup phenomena and fatigue. (Author's abstract)

8010

Moore, W. L.

PROTECTIVE HELMET SUSPENSION.—U. S. Patent 2,784,408. March 12, 1957. DP

A helmet for protecting the pilot's head, comprising an outer resilient shell and an integral adjustable sling adapted to surround the top and upper surfaces of the head, is described and illustrated. An outwardly extending bead portion acts as a bumper to provide additional protection to the sensitive forehead region.

8011

Nocoloff, C.

EFFECTS OF CLOTHING ON RANGE OF MOTION IN THE ARM AND SHOULDER GIRDLE.—State Univ. of Iowa, Iowa City; issued by Quartermaster Research and Engineering Center. Environmental Protection Research Division, Natick, Mass. (Project no. 7-83-01-004A). Technical Report no. EP-49, June 1957. iv+31 p. AD 142 863

PB 132439

As part of a larger study of the effect of clothing restriction upon range, speed, and strength of movement, measurements were taken of the range of movements combining shoulder flexion, abduction and adduction, and elbow flexion carried out by 359 ROTC students, with and without an arm and shoulder harness simulating clothing restriction. Decrements in range of movement were found resulting from clothing restriction and differences related to age. (Author's abstract)

8012

[OXYGEN SYSTEMS AND EQUIPMENT IN AVIATION]

Sistemas e equipamentos de oxigênio de aviação.—Revista médica da aeronáutica (Rio de Janeiro), 9 (3-4): 121-152. July-Dec. 1957. In Portuguese.

DNLM

This is an outline of oxygen systems and equipment used in aviation with emphasis on the following topics: classification of oxygen systems, computation of the duration of the oxygen supply, amount of oxygen required during flight, manufacture and purity of oxygen and oxygen systems, and maintenance of oxygen systems.

8013

PRESSURE SUIT REPORTS.—U. S. Navy Med. News Letter, 30 (8): 37-40. Oct. 18, 1957.

DNLM (W2.A5.B9Me)

Two experiences with the Navy modified partial-pressure suit and the new prototype two-pound full-pressure suit are given by the pilots concerned. The two-pound pressure suit as compared with the partial pressure suit provided very little mobility, visibility, and comfort in the uninflated condition. In the inflated condition, it was more comfortable, and afforded more mobility and visibility than an inflated partial-pressure suit.

8014

PRESSURE SUITS FOR SOVIET PILOTS HAVE SIMILARITIES TO U.S.—Aviation Week, 67 (9): 101-102. Sept. 2, 1957. DLC (TL501.A8, v. 67)

Details of late-model Russian high-altitude pressure suits are presented and analyzed and compared with various United States models. These features are shown in the first pictures of Soviet pressure suits to reach the United States. One suit has many points in common with a USAF design; it is possibly a Russian copy or even a captured USAF suit. The other two suits are obviously full-pressure suits with some resemblances to the Goodrich full-pressure suit. The advantages and disadvantages of the Russian suits are discussed as they relate to vision, crash protection of the inner helmet, weight, and donning ease.

8015

Rawlins, J. S. P.

DESIGN OF CRASH HELMETS.—In: The first European congress of aviation medicine, p. 97-123. Aero-

medica acta (Soesterberg, Netherlands), Special edition, 1957. In English. DNLM

Research on the frequency, site, and mechanisms of head injury is reviewed. Brain injuries result from (1) direct penetration, (2) deformation of the skull with or without skull fracture, (3) angular accelerations, and (4) linear acceleration. Experimental research has helped to clarify the fundamental requirements for crash helmet design. Development of the Mark I Protective Helmet now in use in the Flying Services in Britain is discussed and its value illustrated by several case histories of aircraft accidents.

8016

Reed, W. B.

AVIATORS' HELMETS.—U. S. Patent 2,809,374. Oct. 15, 1957. DP

A helmet comprising a plurality of panels of cloth-like material connected at the meeting edges to form a composite structure to fit the head of the wearer is described and illustrated.

8017

Reed, W. B.

MEANS FOR SUPPORTING APPARATUS ON THE HEAD.—U. S. Patent 2,810,385. Oct. 22, 1957. DP

A head harness is described and illustrated for supporting a pair of earphones and an oxygen mask in proper position on the head. The harness is adjustable to properly fit the face.

8018

Reed, W. B.

OXYGEN MASKS EMBODYING MEANS FOR VENTILATING GOGGLES.—U. S. Patent 2,810,386. Oct. 22, 1957. DP

A description is presented of an apparatus combining goggles with lens-supporting frames shaped to assume an intimate air-sealed relation with the face and eyes and an oxygen mask fitting over the nose and mouth.

8019

Roxburgh, H. L.,
and J. Ernsting

THE PHYSIOLOGY OF PRESSURE SUITS.—Jour. Aviation Med., 28 (3): 260-271. June 1957. DLC (RC1050.A36, v. 28)

The physiological effects of simultaneous application of pressure breathing and a partial-pressure suit (on respiration and circulation) are discussed. Equipment which will maintain an absolute pressure in the lungs of 141 mm. Hg in the event of exposure of aircrew to altitudes above 40,000 ft. will afford short-term protection against those altitudes and enable emergency descent to be made. A compromise is dictated between the physiologic ideal of full body pressurization and the operational ideal of the fully efficient man. The degree of regional counterpressure required is dependent upon the magnitude of the pressure necessary to maintain an intrapulmonary pressure of 141 mm. Hg and the length of time for which it is operative. (Authors' summary, modified)

8020

SAFER, MORE COMFORTABLE SUIT DEVELOPED FOR SUPERSONIC FLIGHT.—Aviation Week, 67 (7): 32. Aug. 19, 1957. DLC (TL501.A8, v. 67)

A new light-weight flying suit is described for use in supersonic fighters, interceptors, and bombers. The new garment, under development at Convair's Human Engineering Group, based on the partial-pressure concept, is made up of an improved helmet, boots, and gloves which are integrated in the flight suit. The advantages of the new suit are described as they relate to greater safety, more mobility, and increased comfort for supersonic pilots.

8021

SantaMaria, L. J.,

P. R. Tiller, and L. M. Libber

A PHYSIOLOGICAL COMPARISON OF VENTILATED AND NON-VENTILATED ANTI-EXPOSURE SUITS UNDER SIMULATED COCKPIT CONDITIONS.—Naval Air Material Center. Air Crew Equipment Lab., Philadelphia, Pa. (Project no. TED NAM AE-52114). Report no. NAMC-ACEL-353, Nov. 1, 1957. vi+13 p. AD 146 653 UNCLASSIFIED

The physiological effects of a water-impermeable, vapor-permeable anti-exposure suit and a completely impermeable suit were studied in a series of tests involving two subjects with replication. All tests were run at 18,000 ft. simulated altitude for two hours with the subject in a sitting-resting state. The vapor-permeable (Vaportex) and impermeable (neoprene) suits were worn in the non-ventilated condition. The impermeable suit, in addition, was used in the ventilated state, the temperature of the ventilating air being equivalent to the experimental ambient temperature. Ambient temperatures of 60°F., 80°F., and 100°F. were employed. At each experimental ambient temperature, the ventilated neoprene suit effected the lowest total body weight loss, weight deficit, and mean weighted final skin temperature. On the basis of physiological data concerning total weight loss, evaporative weight loss, mean skin temperature, rectal temperature, and weight deficit, a ventilated impermeable anti-exposure suit was more advantageous than a water-impermeable, vapor-permeable suit. (Authors' abstract, modified)

8022

Simon, E.,

F. W. Thomas, and P. J. Wiegand

NOISE ATTENUATING EAR PROTECTORS.—U. S. Patent 2,782,423, Feb. 26, 1957. DP

A sound-attenuating ear protector comprising an ear-enclosing pad of resilient deformable foamed polyester resin-isocyanate plastic is described and illustrated.

8023

Stingely, N. E.

AEROMEDICAL EVACUATION LITTER PATIENT SAFETY HARNESS.—Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio (Project no. 6354). WADC Technical Report no. 57-6, Jan. 1957, iv+68 p. AD 110 695 PB 137 351

An aeromedical evacuation litter-patient safety harness was modified to function with the modified standard rigid aluminum pole folding litter. The psychotic restraints were deleted from the harness and a modification of the standard wrist and ankle restraint was used in conjunction with the harness for psychotic-neurotic patients. Dynamic litter tests indicated that the harness would restrain the patient up to at least 7.2 g and that the patient will better withstand the impact force if he is loaded

head forward in relation to the aircraft. (Author's abstract, modified)

8024

Sweringer, J. J.
AN ADHESIVE TYPE OXYGEN MASK.—*Jour. Aviation Med.*, 28 (1): 19-22. Feb. 1957.

DLC (RC1050.A36, v. 28)

The mask, designed for use by unindoctrinated aircraft passengers exposed to an emergency decompression, was tested and found to be very effective. It is comfortable, leakproof, and applicable to any conceivable facial contour. As a result of three speed tests with 33 subjects, 100% donned their masks in less than 10 seconds as opposed to 29% for the B.L.B. mask and 6% for the K-S mask in the same length of time.

8025

Tiller, P. R.,
and H. R. Greider
EFFECTS OF ACTIVITY ON METABOLIC RATES OF SUBJECTS WEARING THE FULL PRESSURE SUIT.—*Naval Air Material Center. Air Crew Equipment Lab, Philadelphia, Pa. (Project no. TED NAM AE-5109). Report no. NAMC-ACEL-345, July 12, 1957. v+6 p.*
UNCLASSIFIED

Metabolic rate and oxygen consumption were compared for subjects performing a simple pilot task in a mock-up F7U cockpit while wearing a (1) summer flight suit, (2) full pressure suit unpressurized, or (3) full pressure suit pressurized (to 2.0 p.s.i.). Statistically significant differences in the metabolic rates were observed only between subjects when wearing the full pressure suit pressurized and when wearing the summer flight suit or the pressure suit unpressurized. Metabolic rates in simulated combat and emergency conditions are calculated to be considerably higher in the pressure suit pressurized than in the summer flight suit. Further experimentation for extended periods of time should be conducted.

8026

Woodcock, A. H.,
and J. R. Breckenridge
MOISTURE INDEX, A NEW CLOTHING VARIABLE [Abstract].—*Federation Proceedings*, 16 (1, part 1): 139. March 1957. DLC (QH301.F37, v. 16)

By means of the clo and moisture indices, upper and lower limits can be arbitrarily determined of the range of temperatures in which clothed man can remain in thermal equilibrium at a given heat-production rate. The moisture index is based on the conversion of difference in vapor pressure between skin and environment into an equivalent temperature difference which is added to the measurable temperature difference between skin and environment. Furthermore, with a knowledge of the insulation and moisture index of clothing, the increment of heat loss from the skin caused by a rise in either vapor pressure or temperature of skin can be predicted independent of environmental conditions. (Authors' abstract, modified)

8027

Zwislocki, J.
EAR PROTECTORS.—In: *Handbook of noise control*, p. 8-1 to 8-27. Ed. by C. M. Harris. New York: McGraw-Hill Book Co., 1957. DLC (TA365.H3)

Ear protectors are of great value in reducing the noise level at the ear by 10-45 decibels, and occa-

sionally to 50 decibels, depending on their make and the sound frequency. Ear protectors are divided into four categories according to their position relative to the ear: plugs, semi-inserts, muffs, and helmets. Ear protectors, irrespective of type, must comply with the requirements of (1) sound attenuation, (2) comfort, (3) absence of adverse effects on skin, (4) conservation of speech intelligibility, (5) ease of handling, and (6) durability. Various types of ear protectors are illustrated and evaluated. (44 references)

c. Bailout and Bailout Equipment

8028

BOOMS STABILIZE SUPERSONIC ESCAPE SEAT.—*Aviation Week*, 67 (8): 30-31. Aug. 26, 1957.

DLC (TL501.A6, v. 67)

A new B seat for supersonic ejection is described which has shown excellent stability characteristics during tests on a supersonic track. This seat substitutes telescoping booms and fins for stubby rudders and stabilizers to eliminate the roll-yaw coupling motion encountered with old-model seats. Tests to date have included ejecting dummy and seat by rocket from a sled traveling at supersonic speed. To follow are tests simulating the complete ejection cycle: rotating the seat to the supine position, extension of telescoping booms and fins, and separation of the dummy from the seat.

8029

Bosee, R. A.
ACCESSORY EQUIPMENT AND TESTING PROBLEMS.—In: *Problems of escape from high performance aircraft. Jour. Aviation Med.*, 28 (1): 83-90. Feb. 1957. DLC (RC1050.A36, v. 28)

Recently developed ejection seats with automatic harness releases and altitude-controlled parachute deployment devices permit comparatively safe ejection from high and low altitudes at subsonic speeds. The reefed parachute, currently being tested, will permit more stable descent from high altitudes and will offer a very low opening shock. The escape capsule does not seem to be desirable in high-speed, low-altitude escapes (the majority of ejections occur at relatively low altitudes). An aerodynamically stabilized seat and a "cocoon-like" protective covering for the pilot may be more suitable for this purpose, since the wind blast forcing his body against the seat would tend to evenly distribute the decelerative g forces.

8030

Brown, Boyd E.,
and L. Slaughter
PILOT SEAT AND ESCAPE MEANS.—U. S. Patent 2,806,666. Sept. 17, 1957. DP

An aircraft escape capsule is described and illustrated, the essential feature of which is a two-part spherical-shaped capsule. The inner segment holds an inflatable cushion which supports the pilot during normal flight, while the outer segment is adapted to rotate and may be pulled over the pilot's head to enclose the inner segment, thereby forming a completed capsule of spherical shape. Fins are provided to stabilize the capsule's position with respect to the slip-stream, while transparent windows in the capsule permit the pilot to judge when to release himself in order to operate his parachute.

8031

Christian, G.

SUPERSONIC ESCAPE CAPSULE COMPLETED.—
Aviation Week, 66 (21): 77, 80, 82. May 27, 1957.

DLC (TL501.A8, v. 66)

A supersonic escape capsule prototype has been completed by the Stanley Aviation Corporation under contract with Wright Air Development Center, Ohio. Although designed specifically for Convair's F-102A delta-wing fighter, the capsule can be adapted to a number of Air Force or Navy supersonic fighters. The capsule enables the pilot to leave his plane in a pressurized, airtight, watertight cocoon to protect him from supersonic blast, violent deceleration, anoxia, and extreme cold. The device is ballasted to float right side up if it lands on water and contains survival equipment and food to help the pilot stay alive regardless of landing location.

8032

Christian, G. L.

CRASH PROGRAM SEEKS EJECTOR FOR HIGH MACH ESCAPE.—Aviation Week, 66 (13): 94-96, 99, 103, 105, 107, 111, 113, 115-116. May 6, 1957.

DLC (TL501.A8, v. 66)

Progress is reported in a crash program to remedy the deficiency of subsonic escape systems in supersonic aircraft. The organization is described of the director of the program, the Industry Crew Escape Systems Committee (ICESC), and its associates in industry. A group of five United States Air Force technical specialists and engineers, called the Air Force Coordinating Committee, sits in on all ICESC functions to evaluate its work. Various ejection configurations now under consideration are described, including the downward ejecting D-seat, upward ejecting B-seat, and the A-seat. Possible features of future escape systems are discussed. Descriptions are also given of an investigation of air crew personal equipment as it relates to durability during high speed ejection.

8033

Evrard, E.

[RESCUE OF AVIATORS BY MEANS OF EJECTION SEATS] Le sauvetage des aviateurs par siège éjectable.—Air Technical Intelligence Center, Wright-Patterson Air Force Base, Ohio [Report no. ATIC-305111-A, Translation no. F-TS-9115/III of report by Belgian Air Force Medical Service, 1956]. [1957] 25 p. AD 140 536 UNCLASSIFIED

During a period of five years (1952-1956) fifteen cases, wherein ejection seats were used in the pursuit plane squadron of the Air Force, were recorded. Five ejections ended in the death of the users. Ten cases of ejection saved the pilots' lives. An analysis of the medical aspects of the ejection conditions and their consequences for the aviator may be taken as precious, practical lessons. Effort is made: (1) to describe the circumstances surrounding the ejection where the consequences were fatal, and those where the conditions under which the ejection took place were abnormal, and (2) to contemplate the consequences from the study of these cases as far as practical purposes are concerned. (Author's summary)

8034

Frost, R. H.

ENGINEERING PROBLEMS IN ESCAPE FROM HIGH PERFORMANCE AIRCRAFT.—In: Problems of es-

cape from high performance aircraft. Jour. Aviation Med., 28 (1): 74-77. Feb. 1957.

DLC (RC1050.A36, v. 28)

The elements of the over-all problem of ejection escape are viewed in light of the whole escape system. A stabilized ejection seat which could be ridden to the ground is suggested as an intermediate towards the development of an ejection capsule. Such a seat would permit a more effective restraint harness, a more adequate supply of survival equipment, and a safer landing. The pilot's escape decision might be implemented by an "impending crash" warning computer.

8035

Frost, R. H.

OUT AND DOWN SAFELY.—Combat Crew (Strategic Air Command), 7 (11): 24-29. May 1957.

DLC (UG633.A15, v. 7)

The development is reviewed of ejection seats designed as an emergency escape device from aircraft. The first seat was installed in German fighters in 1941, and later in 1945 by Sweden and Great Britain. American efforts on the development of both the upward and downward ejection seats are discussed emphasizing the design, physiological effects of ejection on pilots, current modifications, and performance. Mention is made of pressure-suit protection for high-speed, high-altitude flight. Photographs are included of the German and Martin-Baker seats, B-47 downward ejection seat, Stanley long-range tiltable seat, and Stanley lightweight ejection seat.

8036

Henderson, A. M.

WHAT ABOUT TODAY?—Flying Safety, 13 (8): 2-9. Aug. 1957.

DLC (UG633.F43, v. 13)

A brief description and evaluation is presented of ejection seats, automatic parachute opening devices, canopy releases, partial pressure suits, helmets, ventilating garments, anti-exposure suits, and survival kits. Consideration is given to the factors of windblast and drag, deceleration, free falling, spinning, tumbling, parachute opening shock, and open parachute descent associated with parachute jumping. Recommendations are made for ground landings, landing impact, tree and water landings. Emphasis is placed on preflight inspection of parachute and flotation gear.

8037

Hoover, G. W.

PREDICTIONS FOR THE FUTURE.—In: Problems of escape from high performance aircraft. Jour. Aviation Med., 28 (1): 95-100. Feb. 1957.

DLC (RC1050.A36, v. 28)

Man's psychophysiological limitations are the constants around which any man-machine system must be designed. Contemporary and future vehicles must meet requirements of efficiency, versatility, safety, reliability, and economy. With these ideas in mind predictions on future aerospace vehicles may be made. A feasible future development in line with current trends is the "standard cockpit" system, a cockpit which would be interchangeable between trainer, fighter, bomber, and reconnaissance aircraft. In addition, it might function as an emergency escape capsule providing for pilot safety and the recovery of expensive equipment.

8038

JUST A TRIGGERMAN.—Flying Safety, 13 (5): 17-21. May 1957. DLC (UG633.F43, v. 13)

With the advent of automatic-opening safety lap belts and automatic-opening parachutes, the odds of ejecting safely from jet aircraft have increased considerably. Three basic types of automatic belts are shown, the MA-1, MA-3 and -4, and MA-5 and -6. Each opens automatically either one or two seconds after ejection, depending on the type of initiator installed in the aircraft. Instructions are given for the belts in locked, automatically-opened, or manually-opened positions. In order to obtain the greatest advantages from the automatic features, both the lap belt and parachute combination must be worn and properly connected.

8039

Kilgariff, T. G.,

ESCAPE FROM HIGH-PERFORMANCE AIRCRAFT. —Aeronaut. Engin. Rev., 16 (7): 59-64. July 1957. DLC (TL501.A326, v. 16)

An acceptable escape system designed into an airplane allows the pilot to activate it under all flight conditions; eliminates the possibility of explosive decompression; applies ejection-seat acceleration forces within human limits; directs the pilot in a trajectory clear of the airplane structure; and reduces the effects of windblast, tumbling, and deceleration to within the limits of human tolerance. The designer should also provide adequate solutions to the problems of preventing anoxia, frostbite, and aeroembolism and to reducing the parachute-opening shock. Upon successful return to earth, the pilot should be provided with survival provisions to allow him to sustain life under adverse environmental conditions. Recommendations are made for the future design and testing of escape systems and flight equipment.

8040

Kugler, J. T.

ENCAPSULED EJECTION ESCAPE MEANS FOR AIRCRAFT.—U. S. Patent 2,806,667. Sept. 17, 1957. DP

A downward ejecting escape capsule for aircraft is described and illustrated. It consists of a downward and forward curved chute provided with a person-carrying vehicle in its upper part and formed to move forward through the end of the chute opening on the airplane bottom.

8041

Latham, F.

A STUDY IN BODY BALLISTICS: SEAT EJECTION. —Proc. Roy. Soc. (London), series B, 147 (926): 121-139. Aug. 1957. DLC (Q41.L7, v. 147)

To define the upper limits of tolerance for short-duration accelerations acting through the vertical axis of the body, subjective reactions from tests in vertical ejection rigs were assessed. Accelerometers on the head and waist recorded up to 30 g lasting 0.01 to 1.0 sec. Frequency and damping characteristics of the man-seat system were determined by vibrating the system over the frequency range of 1 to 20 c./sec., and by use of sledge-hammer and seat-drop experiments. Tolerance was found to be conditioned by the force-time function of the ejection gun, the alignment of the body and seat, and the dynamic characteristics

of the seat pack. For minimum overshoot of acceleration in the body the optimum duration of force was 0.23 sec. Low-frequency response of the man was the important variable, and after 0.1 sec. of initial acceleration it produced effects of large magnitude. Previously defined limits of 300 g/sec. as a rate of change and 25 g of peak thrust should be adhered to as anatomical limits. Maximum overshoot in the body would result with a rate of acceleration change increased to 400 g/sec.

8042

Martin, J.

BALING OUT AT HIGH FLYING SPEEDS.—Interavia (Geneva), 12 (1): 52. Jan. 1957. DLC (TL500.I555, v. 12)

Safe escape from high-speed aircraft is discussed as it relates to equivalent air speed and Mach number with the former being suggested as the more crucial factor. The effectiveness of ejection seats and capsules as procedures of escape is also discussed including their advantages and disadvantages. The ejection seat is offered as the better procedure of escape from aircraft now in use or planned for the near future. The particular problems are those of escape near the ground, both at high and low ejection speeds, speeding up separation of the occupant from the seat after ejection, and getting the parachute deployed quickly. A successful ejection seat test at 600 m.p.h. with timing for the release of the parachute set at 1 1/2 seconds is mentioned.

8043

Mazza, V.

IF THE BIRD GOES APE ... CAN YOU ESCAPE?—Combat Crew (Strategic Air Command), 7 (9): 20-25. March 1957. DLC (UG633.A15, v. 7)

Eight incidents are reported of ejection experiences at altitudes from 850 to 33,500 feet. All instances were successful, with one exception. An evaluation of the incidents reveals that errors were made even with automatic equipment and were probably due to inadequate indoctrination and misconceptions. Statistics indicate that 70-80% of ejectees could be saved if fully automatic equipment were available.

8044

Mohrlock, H. F.

AIRCRAFT PERFORMANCE SYSTEMS RELATED TO ESCAPE SYSTEMS.—In: Problems of escape from high performance aircraft. Jour. Aviation Med., 28 (1): 59-64. Feb. 1957. DLC (RC1050.A36, v. 28)

The speed and altitude capabilities of high-performance aircraft can subject an ejecting crew member to decelerative forces in excess of the limits of human tolerance (about 38 g, encountered in ejection at an equivalent air speed (EAS) of 600 knots). A reduction in these decelerative forces may be achieved by lowering the weight-drag ratio of the occupied ejection seat. Other escape problems include aerodynamic stabilization of the seat, elimination of obstructions in the ejection path, and provision for survival after ejection. The solutions to these problems will be found through more efficient man-machine integration.

8045

MORE ABOUT AERIAL ESCAPE: A BOBSLED RIDE

FOR SAFETY.—Aircraft (Toronto), 19 (6): 55. June 1957. DLC (TL501.A56143, v. 19)

A new "aerial bobsled" ejection seat for supersonic Century series jet aircraft is being developed by the U.S. Industry Crew Escape System Committee. The new seat, which projects the pilot feet first and on his back into the supersonic airstream, is aerodynamically shaped and equipped with stabilizing fins. One of the distinguishing features of this device is the rotation of the seat and pilot 90° into the supine position before separation of the seat from the cockpit. Another innovation is the method by which the pilot is positioned and secured in the seat before ejection from the cockpit. The series of events mentioned above takes place automatically upon activating the D-ring on the seat.

8046

Moseley, H. G.

U. S. AIR FORCE EXPERIENCE WITH EJECTION SEAT ESCAPE.—In: Problems of escape from high performance aircraft. Jour. Aviation Med., 28 (1): 69-73. Feb. 1957. DLC (RC1050.A36, v. 28)

The 757 Air Force ejection escapes since 1955 have resulted in 23% fatalities and 14% major injuries. The great majority of ejection attempts were made at medium and low altitudes and at medium and low speeds. Impact with the ground after failure to separate from the seat and deploy the parachute has been the outstanding cause of fatalities. Air speed has had little effect on the outcome except in cases of ejection at or near the speed of sound. A reduction in fatality rate will be facilitated by improved conditions for escape at low altitudes and low speeds where the majority of emergencies occur. If escape at supersonic speeds is to be successful, the effects of deceleration and other associated phenomena must be mitigated. (Author's summary, modified)

8047

Narisi, S. L.

TIME OF FALL IN LOW ALTITUDE ESCAPE.—Frankford Arsenal, Philadelphia, Pa. (DA Project no. 502-06-001). Memorandum Report no. MR-664, Dec. 1957. i+9 p. AD 155 146 UNCLASSIFIED

With regard to time of fall, the most favorable conditions for a successful catapult-initiated evacuation at low altitude are: maximum speed at maximum angle of climb, the highest attainable catapult velocity, a bank angle of zero degrees, and a minimum weight of seat and parachute. This is, however, theory based solely on the assumptions made in the mathematics. Practical considerations, such as human endurance, performance of mechanical components, etc., have not been taken into account. (Author's conclusions)

8048

Poppen, J. R.

INTRODUCTION AND HISTORY OF THE AIRCRAFT ESCAPE PROBLEM.—In: Problems of escape from high performance aircraft. Jour. Aviation Med., 28 (1): 57-59. Feb. 1957. DLC (RC1050.A36, v. 28)

A short history is given of aviation escape mechanisms and associated problems, from the parachute of World War I through the ejection mechanisms of today's supersonic aircraft. This is followed by a brief introduction of each of the symposium's sub-topics and their authors.

8049

PROBLEMS OF ESCAPE FROM HIGH PERFORMANCE AIRCRAFT: A SYMPOSIUM.—Moderated by C. P.

Phoebus. Jour. Aviation Med., 28 (1): 57-100. Feb. 1957. DLC (RC1050.A36, v. 28)

This is a collection of 9 reports by various authors, abstracted as items no. 8029, 8034, 8037, 8044, 8046, 8048, 8052, 8055, 8056.

8050

SAFE ESCAPE AT MACH 2.—Aircraft (Toronto), 19 (5): 50. May 1957. DLC (TL501.A56143, v. 19)

A new Lockheed pilot ejection system is described, which basically resembles present jet fighter seats and features (1) vertical fins which extend along the sides, (2) stub-like wings, and (3) a waffle-sized steel wind deflector mounted on a four-foot boom in front of the occupant. It would reduce by 50% the g-load and eliminate the tumbling effects pilots could conceivably experience with a conventional ejection seat in a 1500 m.p.h. bailout at 30,000 feet. To abandon the aircraft, a crew member has only to pull up on a D-shaped ring located between his feet. The new system (weighing only 35 pounds more than present ejection seats) can be adapted to fit most Air Force jet fighters, high-altitude interceptors, or bombers.

8051

Sperry, E. G.

MECHANICAL TRAUMA OF HIGH SPEED AND HIGH ALTITUDE BAILOUT.—Amer. Jour. Surg., 93 (4): 732-733. April 1957.

DLC (RD1.A37, v. 93)

There are three principal factors which may induce mechanical trauma during emergency bailout, namely, deceleration, wind blast, and spinning. Two of these are discussed, including descriptions of the types of injuries resulting directly or indirectly from wind blast and those obtained from spinning. In spinning, aside from the physiologic aspect, panic is a real hazard. A bleak picture is described of the air crew's chances for survival during bailout. Fortunately a large number of these emergencies occur at relatively low altitudes and at tolerable air speeds. For the extreme conditions the Air Force, Navy, and industry have implemented an accelerated program to correct deficiencies. Design effort is primarily aimed at providing escape capsules for future aircraft and improved ejection seats for aircraft already built.

8052

Stapp, J. P.

HUMAN TOLERANCE FACTORS IN SUPERSONIC ESCAPE.—In: Problems of escape from high performance aircraft. Jour. Aviation Med., 28 (1): 77-82. Feb. 1957. DLC (RC1050.A36, v. 28)

Measures must be taken to permit escape from aircraft on the ground or at low flight levels, and to avoid inadvertent ejections through the canopy. The effects of wind drag deceleration, tumbling and spinning, and wind blast, encountered in high-altitude and high-speed ejections, must be kept within human tolerance limits. These effects may be minimized in a "rideable" ejection seat. The rideable seat would lend itself to low-level escape more readily than would an ejection capsule, and, in the interest of economy and over-all aircraft efficiency, it may be the best arrangement for a long time to come.

8053

TEMCO ORDERS NEW EJECTION SEAT TYPE.—Aviation Week, 66 (16): 123. April 22, 1957.

DLC (TL501.A8, v. 66)

Descriptions and results of testing are presented of new type ejection seat (ordered from Hardman Tool and Engineering Co., Los Angeles, Calif.) for Temco Aircraft Corp.'s TT-1 primary jet trainer. The seat design eliminates the need for adjustable head and foot rests. An integrated pilot restraint system attaches to the shoulder harness inertia reel which allows the pilot freedom of movement, yet assures immediate arrest of forward movement, plus instant separation following ejection or ditching. The seat is designed for a 25-g ejection load and a 40-g crash load. It has withstood 60 g deceleration in tests.

8054

TWO NEW ESCAPE SEATS DEVELOPED.—Aviation Week, 66 (17): 37. April 29, 1957.

DLC (TL501.A8, v. 66)

Two new upward ejection seats (the B-seat—which rotates the pilot 90° backward so that he enters the slip stream feet first—and the A-seat—an upward ejecting version of the forward-facing skin flow generator seat developed by Lockheed) are being developed by the Industry Crew Escape Systems Committee (ICESC). The fetal position assumed by the pilot in the B-seat with knees drawn up protects his viscera from wind blast; streamlining of the seat in its supine position reduces deceleration forces; and fins stabilize the seat after ejection. The A-seat also has good deceleration and stability characteristics as well as the added advantages of weighing less than the B-seat, being simpler to operate, and having greater compatibility with cockpit configurations of various Century Series fighters. ICESC has recommended that both B and A configurations be developed through the sled-test phase.

8055

Wilbur, C. E.

U. S. NAVY OPERATIONAL EXPERIENCE WITH EJECTION SEAT ESCAPE.—In: Problems of escape from high performance aircraft. Jour. Aviation Med., 28 (1): 64-68. Feb. 1957. DLC (RC1050.A36, v. 28)

The 177 ejection escapes from Naval aircraft since 1949 are reviewed with respect to the circumstances associated with them. Significant survival percentages are: 96% for ejections above 5000 ft., 7% for ejections below 1000 ft., 90% for ejections below 400 knots, and 55% for ejections above 500 knots. Desirable and undesirable features of the Navy's "face curtain fired" ejection seat are also reviewed.

8056

Zeller A. F.

PSYCHOLOGIC FACTORS IN ESCAPE.—In: Problems of escape from high performance aircraft. Jour. Aviation Med., 28 (1): 90-95. Feb. 1957.

DLC (RC1050.A36, v. 28)

Ejection escape is analyzed as a perception-decision-action sequence. Delay, a major cause of unsuccessful ejections, is most likely to occur in the first two phases of this sequence. After the pilot clears his aircraft, panic, disorientation, or confusion may cause him to delay deployment of his chute, or to deploy it prematurely. Lack of confidence in his escape equipment may lead a pilot to hesitate to

eject; lack of experience may cause him to evaluate an emergency erroneously and to eject when the plane could be saved.

d. Survival and Rescue (On Sea, Land, in the Desert, Artic, etc.)

8057

Allen, W. H.,

and A. W. Pond

SEA WATER, SURVIVAL OR SUICIDE?—Combat Crew (Strategic Air Command), 8 (4): 27-29. Oct. 1957. DLC (UG633.A15, v. 8)

Air Force survival instructions warn men against drinking sea water because actual survival experience has shown that men who drink no water at all live longer than those who drink sea water. Sea water is to be regarded as a poison and not drunk in any quantity, in any form, or at any time. It causes the body to lose water through vomiting and diarrhea, and its high salt content forces the body to use fluids to eliminate the excess minerals. The expected survival time at different environmental temperatures with no water or various quantities of water is tabulated.

8058

DESIGN FOR LIVING.—Aeronautics (London), 36 (3): 32-38. May 1957. DLC (TL501.A5512, v. 36)

Search and rescue activities are discussed of the Royal Air Force with the cooperation of the Royal Navy and U.S. Air Force in Britain. Their increased effectiveness in Britain has evolved from an ad hoc arrangement before the second World War, through the organized air-sea rescue services of the war years, to the highly efficient service that it is today. The original objective of rescuing ditched aircrews—though still not subordinated to other demands—has been widened to include all types of emergencies, including, for example, aid to injured mountain climbers. Three main patterns of rescue are described as well as types of vehicles employed and coordination of communication and activities among many components.

8059

Donley, H. L.

COLD WEATHER TESTS ON PNEUMATIC SHELTER RAFT.—Arctic Aeromedical Lab., Ladd Air Force Base, Alaska (Project no. 7956-1). Technical Note no. AAL-Tn-57-18, July 1957. 11 p. AD 236 486

UNCLASSIFIED

Cold-weather habitational suitability tests were conducted on the global shelter-raft, pneumatic, 20-man, under arctic and subarctic conditions. Results indicate that the shelter-raft would be adequate as an emergency cold weather shelter for downed airmen, and as an emergency para-rescue shelter. It would also suffice as a temporary shelter for persons doing isolated work in the Arctic provided that it be limited to four or five men. Shortcomings of the present experimental model are indicated and steps to be taken to correct these deficiencies before additional suitability tests are conducted, or prior to standardization of this type equipment for global use are presented. (From the author's abstract)

8060

Greer, F. L.,

W. O. Pearson, and M. D. Havron

EVASION AND SURVIVAL PROBLEMS AND THE PREDICTION OF CREW PERFORMANCE.—Psychological Research Associates, Washington, D. C. (Contract AF 41(657)-65); issued by Air Force Personnel and Training Research Center. Office of Social Sciences Programs, Lackland Air Force Base, Tex. (Project no. 7723, Task no. 77461). Technical Report no. AFPTRC-TR-57-14, Dec. 1957. 55 p. AD 146 426 PB 135 921

This report, which has two, separately bound supplements, summarizes research and development of a criterion evasion-and-survival field problem designed to reflect in kind and in relative importance the critical situations a group of men might encounter if they went down behind enemy lines. An effort was also made to identify questionnaire-type instruments that would predict crew performance as measured by the criterion problems. The Crew Survival Capability Test (CREWSCAT) involved a six-hour problem covering a two-mile course. This was administered to 76 crews from USAF Survival Training School. Results for the criterion problem and predictor instruments were analyzed for 60 crews. Comparisons with previous Army studies are made. (Authors' abstract) (28 references)

8061

Greer, F. L.,

W. O. Pearson, and M. D. Havron

EVASION AND SURVIVAL PROBLEMS AND THE PREDICTION OF CREW PERFORMANCE. SUPPLEMENT II. CREWSCAT PROBLEM FORM AND MANUAL.—Psychological Research Associates, Washington, D. C. (Contract AF 41(657)-65); issued by Air Force Personnel and Training Research Center. Office of Social Sciences Programs, Lackland Air Force Base, Tex. (Project no. 7723, Task no. 77461). Technical Report no. AFPTRC-TR-57-14, Supplement II, Dec. 1957. [94] p. AD 146 428 PB 135 946

This research was undertaken to develop a criterion evasion-and-survival field problem that would reflect in kind and in relative importance the critical situations a group of men might encounter if they went down behind enemy lines. An effort also was made to identify questionnaire-type instruments that would predict crew performance, as measured by the criterion problem. This supplement contains forms and observation sheets needed by the umpire to evaluate and critique a crew's performance as well as instructions for planning and operating the Crew Survival Capability Test (CREWSCAT) which was developed. The rationale for the test development and the findings of the study made of crews from USAF Survival Training School are presented in the Technical Report to which this is Supplement II. (Authors' abstract) UNCLASSIFIED

8062

Herrera Alonso, E.

[SEA WATER, POTABLE WATER] El agua de mar, agua potable.—Revista de aeronáutica (Madrid), 17 (204): 878-880. Nov. 1957. In Spanish. DLC (TL504.R516, v. 17)

Two subjects participating in a shipwreck survival exercise for 4 days drank a total of 1,590 grams of sea water per person, in doses of 55 grams every hour and a half during the daylight hours. No significant changes were observed in the subjects resulting

from the ingestion of sea water. It is noted that in an experiment of this type the mental picture or trauma of actual shipwreck cannot be reproduced.

8063

Lemaire,

and Ducros

[DEHYDRATION AND SURVIVAL IN THE DESERT] La déshydratation et la survie au désert.—Centre d'Enseignement et de Recherches de Médecine Aéronautique du Service de Santé de l'Air (Classement no. 5411). Report no. 1, March 20, 1957. 5 p. In French. UNCLASSIFIED

Survival in the desert is investigated as it relates to water restriction and the subsequent dehydration. Human subjects were restricted to three liters of water per day for three days while reclining in the shade in an area with a mean temperature of 42° C. Other subjects (horses) were totally deprived of water for the three-day period and forced to trot in the sun for one hour each day. It is concluded that water equilibrium can be maintained if no less than three liters of water are consumed at a temperature of 40° C. This amount, however, must be augmented if the temperature is higher.

8064

Litvinenko, P. M.,

and P. P. Aleksandrov

[PRESERVATION OF WATER IN HOT CLIMATES] K voprosu o konservirovani vody v usloviakh zhar-kogo klimata.—Voenno-meditsinskii zhurnal (Moskva), 1957 (7): 38-40. July 1957. In Russian. DLC (RC970.V55, v. 1957)

The objective was to preserve river and well water with high mineral contents for 8-9 days. This can be achieved through the addition of some chemicals, the most reliable and economic one being chlorine. After the preliminary coagulation with aluminum sulfate (120 mg./liter) and sedimentation it was sufficient to add 20 mg./liter of chlorine to the water being stored in metallic containers. Water stored in rubberized containers had a rubbery taste and required more chlorine to fit drinking requirements.

8065

Lutz, S.

COLD WEATHER SURVIVAL.—Military Med., 120 (3): 210-215. March 1957. DLC (RD1.A7, v. 120)

Cold weather survival is an ever present problem to the personnel of the United States' projects in arctic areas. Three points for survival are stressed from the medical viewpoint: (1) Although fear is an important factor, survival of the bravest individual is not possible without the proper equipment and the indoctrination and education to understand and use that equipment. (2) Physiologically the most important factor is the maintenance of the body's heat balance; this should be maintained by the proper use of clothing in the injured and non-injured, prevention of frost-bite, and proper dietary habits; other health problems are constipation, sanitation, and snow-blindness. (3) Psychologically it is essential to have the proper leadership to hold together a group of individuals and to instill the will to survive.

8066

Michel, E. M.

SURVIVAL SPACE REQUIREMENT FOR INDIVIDUAL AIRCRAFT ESCAPE CAPSULES.—Wright Air Devel-

opment Center. Aero Medical Lab. Wright-Patterson Air Force Base, Ohio (Project no. 6363, Task no. 63283). WADC Technical Note no. 56-526, Feb. 1957. iv+15 p. AD 110 649 UNCLASSIFIED

In capsular-type aircraft, clothing becomes part of the necessary survival gear. The absolute minimum amount of clothing and survival gear necessary for survival under extreme conditions (sea, arctic, desert) was selected, measured, weighed, and a pack designed to carry the gear. Results showed that a minimum of 3700 cubic inches of space is required for the stowage of survival gear, weighing a total of 70 pounds. (Author's abstract, modified)

8067

Navy Hydrographic Office
METEOROLOGICAL AND OCEANOGRAPHIC
FACTORS RELATING TO ANTARCTIC AIR-SEA
RESCUE OPERATIONS AND HUMAN SURVIVAL.—
Navy Hydrographic Office, Washington, D. C.
Aug. 1957. vii+10 p.+ 57 figures. AD 143 856
UNCLASSIFIED

Three factors that affect human survival are air temperature, wind speed, and sea temperature. The first two combine to produce various categories of wind chill from cool to bitterly cold, beyond which exposed flesh will freeze. Wind chill is based on dry and shaded, overcast, or dark conditions and will be increased in severity if the individual exposed to these conditions is not dry. The third factor, sea temperature, relates to the time a human floating in water may be expected to survive. Survival times range from 2 to 40 hours in waters 60° to 70° F. to 1/4 to 3/4 hours in waters of 32° F. Exhaustion or unconsciousness may occur in one-twentieth to one-third of the expected survival time. This report presents meteorological and oceanographic background information for the supply corridor between New Zealand and McMurdo Sound, Antarctica. Included are general text and monthly or seasonal charts of winds, clouds, visibility, sea and swell, general circulation, ice conditions, sea surface temperatures, wind chill, and immersion hypothermia for the months October through April. (From the abstract)

8068

Williams, V. M.
REPORT ON ARCTIC SURVIVAL KIT, PASSENGER.—
Arctic Aeromedical Lab., Ladd Air Force Base,
Alaska. Technical Report no. 57-3, Aug. 1957. 24 p.
UNCLASSIFIED

A newly developed passenger survival kit is described and tested which can be quickly attached to a standard back-type parachute, and provides some of the essential items of equipment needed to survive in the arctic following an emergency bailout. Jump testing revealed it to be an improvement over the present cargo aircraft survival kit. The individual arctic passenger survival kit should be adopted and provided each passenger when flying in Alaska on cargo-type aircraft. Also, the cargo aircraft survival kits should be reduced in size to include only common use items such as stoves, radio equipment, and weapons.

8069

Zimmerman, W. F.
HAVE YOU PAID YOUR DESERT LIFE INSURANCE?
—Combat Crew (Strategic Air Command), 8 (1): 19-
23. July 1957. DLC (UG633.A15, v. 8)

On the basis of a Strategic Air Command combat

crew's experience on survival in the Libyan desert it is recommended that as much water as possible should be carried on the airplane when flying across deserts. Utensils should be carried for getting water out of desert wells. All persons are advised to remain in the airplane unless they are forced to leave in order to save lives. Travel is advocated only in the cool of the day or at night, towards a well, and not before pinpointing a position. Only lifesaving items should be carried. Walking with a slow, steady speed, with short rests, until exhausted is most advantageous. Flares were found to be ineffective during the day, however the signal mirror was good up to 15 miles. The URC-4 radio proved ineffective for more than five miles. Maintaining a calm attitude is stressed. The most important item needed during the test was found to be the survival manual.

e. Accidents and Accident Prevention

8070

Acker, L. W.,
D. O. Black, and J. C. Moser
ACCELERATIONS IN FIGHTER-AIRPLANE
CRASHES.—National Advisory Committee for
Aeronautics. Lewis Flight Propulsion Lab., Cleve-
land, Ohio. NACA Research Memorandum no.
E57G11, Nov. 4, 1957. 55 p. AD 145 793
UNCLASSIFIED

The magnitude, duration, and direction were investigated of accelerations imposed on the airplane structure and pilot during simulated crash landings. These crashes simulated three unflared landings (each at a different impact angle), a ground cart wheel, and a ground loop. The maximum longitudinal acceleration measured at the center of gravity of the airplane increases rapidly with impact angle from a value of 8 g for the 4° angle of impact to a value of 60 g for the 27° angle of impact. The longitudinal accelerations measured on the cockpit floor during both the ground-loop and cart-wheel crashes are of about the same magnitude (less than 10 g). Such accelerations can be easily tolerated by an adequately restrained pilot. However, human tolerance to normal (vertical) accelerations was exceeded in all the unflared landing crashes. (From the authors' summary)

8071

Adams, A. F.
ANYONE FOR RUSSIAN ROULETTE?—Combat
Crew (Strategic Air Command), 8 (2): 6-10. Sept.
1957. DLC (UG633.A15, v.8)

Accident investigations consistently reveal that pilot error, in the form of technical order violations, is almost always a primary or contributing cause of tragedy. The record shows that about 2% of the evaluation missions involved violations associated with flying safety. Some of the observed violations appear to be due to carelessness and laziness. In some cases the professional capability of the crew showed no evidence of a driving effort to keep abreast. In other instances stupid behavior was evident. Knowledge of the aircraft and the directives are of major importance to aviation safety.

8072

AN AUTOPSY GUIDE FOR AIRCRAFT ACCIDENT FATALITIES.—Joint Committee on Aviation Pathology, Armed Forces Inst. of Pathology, Washington, D. C. iii+[20] p. 1957. DNLM

Revised from JCAP Memorandum no. 1, of February 1956, this is a guide dealing with autopsies performed on aircraft fatalities. The methods used and the collection of data are left to each individual service and country concerned. In postmortem examination the medical officer endeavors not only to determine the identity of the deceased and cause of death, but to collect evidence which will elucidate the cause of the accident, be it a pre-existing or acquired lesion of the pilot or defective or damaged aircraft, thereby possibly contributing to the prevention of such accidents. Five steps are outlined for the pathologist's investigation: (1) familiarization with the type of aircraft; (2) study the available information relative to the flight; (3) careful observation and recording, by writing and photography, the position of body and its relation to total wreckage; (4) meticulous examination of exterior of body and viscera with necessary closeup photographs and x-ray pictures and removal of properly selected tissue for chemical, toxicological, and histopathological examination; and (5) summarizing the report of accident and correlating it with autopsy findings. Included is an attached checklist for assisting the pathologist in obtaining the minimum detailed information necessary for case analysis.

8073

Barthélémy, R.

[THE PILOT AND AIRCRAFT ACCIDENTS] Le pilote et les accidents aériens.—Semaine médicale professionnelle et médico-sociale (Paris), 33 (11): 441-443. March 22, 1957. In French. DNLM

The pilot may be involved in minor accidents while the aircraft is on the ground. For example, he may be hit by a propeller while starting the engine, or sustain a leg injury while descending from the aircraft. However, aircraft accidents which occur during flight are the most important. Experience confirms the significance of human factors in these accidents. Personnel are responsible for 50%; 30-40% are due to faulty equipment and other factors such as meteorological conditions or undetermined causes, and 4% are caused by pilot error. Pilot errors are classified into 3 categories: (1) errors committed during normal routine, (2) those committed during unnatural circumstances (landing in bad weather, etc.), and (3) unclassified errors. Prevention of accidents by improving the pilot's flying technique, selection and training methods, and providing periodic medical examination is considered.

8074

Bergeret, P.,

and R. Marchesseau

[FLIGHT SAFETY AND UNEXPLAINED AIRCRAFT ACCIDENTS IN THE FRENCH AIR FORCE] Sécurité en vol et accidents aériens d'origine indéterminée dans l'Armée de l'Air Française.—Médecine aéronautique (Paris), 12 (2): 109-123. 1957. In French, with English summary (p. 123).

DLC (TL555.M394, v. 12)

Also published in: Force aérienne, Service de santé, Bulletin technique d'information [Bruxelles], 1957 (Dec.): 17-18. In French. DNLM

Thirty-nine flight accidents of unknown cause which occurred in the French Air Force between 1948 and 1956 are reviewed. The type of aircraft, pilot's age, flying experience, and flight conditions are statistically compiled, but no definite picture of the underlying cause for the accident is presented. A high incidence of loss of control during flight was

found during a detailed study of the circumstances surrounding each accident. Loss of control appears to be caused, at times, by physical indisposition, but more often by abnormal behavior aggravated by lack of practical and theoretical experience, which in turn, is responsible for pilot error. It is recommended that: (1) initial psychotechnical selection procedures (psychomotor test batteries) during instruction and training include psychophysiological observation of the pilot in various flight simulators in the presence of the flight surgeon; (2) special psychological indoctrination be given to flight instructors; and (3) more detailed psychophysiological indoctrination be given to flying personnel.

8075

Berkshire, J. R.,

and T. J. Gallagher

THE RELATION OF EARLY FLIGHT TRAINING GRADES TO LATER AIRCRAFT ACCIDENTS [Abstract].—Amer. Psychologist, 12 (7): 443-444. July 1957. DLC (BF1.A55, v. 12)

Naval flight school graduates whose presolo flight grades were in the lowest 3% were found to have from 2.44 to 1.67 times the normal rate of pilot-caused accidents. The ratio of accidents decreased with time in service.

8076

Berry, F. B.

ICARUS AND THE PHYSICIAN: REFLECTIONS ON AIRCRAFT ACCIDENTS AND THEIR PREVENTION.—U. S. Armed Forces Med. Jour., 8 (11): 1603-1615. Nov. 1957. DLC (RC970.U7, v. 8)

Same as item no. 6548, vol. V.

8077

BOTH PILOTS FAIL SIGHTING IN COLLISION.—

Aviation Week, 66 (23): 106-107, 109-110. June 10, 1957. DLC (TL501.A8, v. 66)

A Civil Aeronautics Board investigation is described of an in-flight collision between a Continental Air Lines Douglas DC-3A and a Cessna 170B, approximately two miles southeast of Phillips Airport, Bartlesville, Okla., Sept. 9, 1956. Both aircraft, substantially damaged, were landed safely with no injuries to passengers or crew. The Board determines that the probable cause of this accident was failure of pilots of both aircraft to observe and avoid the aircraft of the other.

8078

Bruno, J. F.

COOPERATIVE SYSTEM IS ANSWER TO MIDAIR COLLISION PROBLEM.—Aviation Age, 27 (3): 108-114. March 1957. DLC (TL501.A8187, v. 27)

The advantages are described of the Madigan Guided Missile Corporation's cooperative system of collision protection. This system consists of an indicator, a transmitter, and a receiver operating with a fixed array of six-horn antennas. Operationally, the system has the following features: (1) quadrant display, to show the relative position of intruding aircraft; (2) audible signal to alert the pilot; (3) range indication by means of changing signal intensity; (4) cooperative detection and warning range of 7.7 nautical miles; (5) warning range of 5.4 nautical miles for light planes equipped with omnidirectional receiver; and (6) accurate bearing and range measuring adaptability. The big objection to cooperative

collision warning systems is that they are not operationally independent. However, many engineers believe that the definite advantages of these systems constitute the more important factor.

8079

Chisolm, L.

A NEW APPROACH TO ANTI-COLLISION LIGHTING.

—Aircraft (Toronto), 19 (8): 25, 74. Aug. 1957.

DLC (TL501.A56143, v. 19)

A new-type safety light for aircraft is described stated to be one of the best devices yet developed to ward off mid-air collisions. The lights, usually four to an aircraft (on wing tips, on the fuselage near the tail, the fourth attached to the underside), each weighing about four pounds, flash at different intervals (three times a second, once a second, once every three seconds) a distinctive bluish-white light that may be seen 50 miles away. The inventor states that his rapidly blinking lights would alert a pilot flying a collision course and allow him time to take evasive action.

8080

Clark, B.,

and A. Graybiel

VERTIGO AS A CAUSE OF PILOT ERROR IN JET

AIRCRAFT.—*Jour. Aviation Med.*, 28 (5): 469-478.

Oct. 1957. DLC (RC1050.A36, v. 38)

Same as item no. 5618, vol. V.

8081

Crook, M. N.,

D. B. Devoe, K. C. Hageman, J. A. Hanson, G. K.

Krulce, and P. G. Ronco

AGE AND THE JUDGMENT OF COLLISION

COURSES.—Tufts Univ. Inst. for Applied Exper-

imental Psychology, Medford, Mass.; issued by

School of Aviation Medicine, Randolph Air Force

Base, Tex. Report no. 57-105, Sept. 1957. 38 p.

AD 147 758 UNCLASSIFIED

The effect of age from 20 to 50 years on ability to judge whether an approaching aircraft is on a collision course with the subject's aircraft was experimentally investigated. The approaching aircraft was simulated by an image projected onto a viewing screen. Responses were scored for (1) errors and (2) time for correct judgments. Errors showed very little change to the early forties, but increased at an accelerated rate in the later years. Judgment time averaged about 1 second later at 50 than at 20 years, the change being approximately linear over the age range. (Authors' abstract)

8082

Davis, J. M.

SPATIAL DISORIENTATION.—*Far East Air Forces*

Command Surgeon's Newsletter, 3 (2): 1-4. Feb.-

March 1957. DNLM

Many variables are found in investigations of aircraft accidents, but in vertigo accidents a few patterns have been established. One factor incriminates inexperience or lack of recent experience of the pilot as related to the aircraft and flight conditions under which an accident occurred. Another factor is that of head movements during a procedure turn. The mechanism of producing disorientation in this case may be miscontrol from the head and hand movements involved with a resultant unusual attitude and vertigo, which begins a series of events resulting in an attitude

difficult to correct. Other factors such as time, semi-contact flying, and mental stress are also involved. Proper indoctrination of student pilots and proper re-indoctrination of trained pilots in the psychopathology of spatial disorientation is recommended in order to decrease the number of fatal accidents.

8083

Douglas, P. P.

THE FIRST 250.—*Flying Safety*, 13 (3): 11-13.

March 1957. DLC (UG633.F43, v. 13)

Statistics show that the first 250 rated flying hours make up the most critical flying period in a pilot's career, whether he is new or transitioning to new equipment. Often it is necessary for the new pilot to be assigned a mission sooner than anticipated, therefore, it is emphasized that he be capable of handling emergencies. A case is reported of an aircraft accident caused because the pilot did not fully understand the operation of the emergency fuel system and did not adhere to prescribed instructions regarding emergency belly landings. It is recommended that pilots have adequate academic, simulator, transition, and tactical training in order to be prepared for emergency procedures.

8084

Evrard, E.

[BLAST AND EXPLOSIVE DECOMPRESSION IN AIRCRAFT ACCIDENTS: ANATOMO-PATHOLOGICAL ASPECTS]

Souffle et décompression explosive dans

les accidents d'avion: aspects anatomo-pathologi-

ques.—*Force aérienne, Service de santé, Bulletin*

technique d'information [Bruxelles], 1957 (Feb.):

41-43. In French. DNLM

Principal macroscopic anatomo-pathological findings after explosive decompression are diffuse congestion, hemorrhage, edema, and atelectasis of the lungs, and diffuse congestion and lesions of other organs. Microscopic examination reveals extensive pulmonary hemorrhage and emphysema, and tympanic hemorrhage. Differential diagnosis is presented of lesions caused when explosion of the aircraft takes place in cases of sabotage or bomb explosion, during explosive decompression or brisk deceleration of the aircraft from high altitude, and by the impact of human contact with either land or water surfaces.

8085

Evrard, E.

[BLINKING, POSSIBLE CAUSE OF AIRCRAFT

ACCIDENTS] Le clignement des yeux, cause possi-

ble d'accident aérien.—*Médecine aéronautique*

(Paris), 12 (2): 151-159. 1957. In French, with

English summary (p. 158-159).

DLC (TL555.M394, v. 12)

Also published in: *Force aérienne, Service de*

santé, Bulletin technique d'information [Bruxelles],

1957 (Aug.): 17-27. In French. DNLM

Fifty pilot candidates took the coordination test on the MSA cockpit. Sixty-four percent of the subjects did not blink during the first 15 seconds, 42% did not blink during the first 30 seconds, etc. The Bourdon-Wiersma test (stipple test) administered to 449 candidates also showed that during the first 2 minutes the blinking rate was slow, but increased as the test progressed. The plateau that followed was characterized by a smaller blinking frequency than that found under normal conditions not involving great attention. Extrinsic factors (corneal, con-

junctional conditions, etc.) may affect blinking frequency in the absence of a psychological influence. It is assumed that in flight blinking occurs very seldom during critical phases such as approaches. Receptor and perceptual anticipation compensate sufficiently for the temporary lack of information caused by a blind period which seldom exceeds 0.55 second. Blinking due to fatigue plays a smaller role than fatigue itself. Although it is not possible to discard blinking entirely as a possible cause of accidents, it appears to play a role only in very unusual circumstances when anticipation is lacking.

8086

FATAL DC-4 FLIGHT HELD 'HAPHAZARD'.—Aviation Week, 67 (22): 99-100, 103-104, 107. Dec. 2, 1957. DLC (TL501.A8, v. 67)

A Civil Aeronautics Board investigation is described of the crash of an Alaska Airlines Douglas C-54B-DC 3.5 miles east of Blyn, Washington, on March 2, 1957. All aboard the aircraft, two passengers and a crew of three, were fatally injured. The findings suggest that the probable cause of the accident was a navigational error and poor judgment exhibited by the pilot in entering an overcast in a mountainous area at a dangerously low altitude.

8087

Frykholm, A.
POST MORTEM EXAMINATIONS IN CONNECTION WITH MILITARY AIRCRAFT ACCIDENT INVESTIGATIONS.—In: The first European congress of aviation medicine, p. 193-198. Aeromedica acta (Soesterberg, Netherlands), Special edition, 1957. In English. DNLM

Careful post-mortem investigations of both military and civil aircraft accidents are recommended similar to the work done in connection with the Comet disasters. A résumé of the investigations carried out in Sweden during a 10-year period on 150 accidents in the Swedish Air Force is included. The findings are, however, tentative due to difficulties in obtaining proper post-mortem examinations in many of the cases.

8088

Gartmann, H.
INDOCTRINATION OF ACCIDENT PREVENTION.—In: The first European congress of aviation medicine, p. 199-202. Aeromedica acta (Soesterberg, Netherlands), Special edition, 1957. In English. DNLM

The work of the SWISSAIR's Board of Accident Prevention in the Technical Workshop is described. All accidents or near accidents, and as many technical and human deficiencies as possible are systematically registered and evaluated. The main idea proposed is that the root of every accident lies in technical or human failure.

8089

Grether, W. F.
EYE IN THE SKY.—Flying Safety, 13 (5): 12-16. May 1957. DLC (UG633.F43, v. 13)

Mid-air collisions and near-misses have increased because of increasing flight speeds and density of aircraft traffic. Most collisions occur during daylight hours. A pilot may fail to see another aircraft on collision course in time to avoid it, even though he is looking outside and visual conditions appear favorable. Once another aircraft has been sighted, the

pilot has 7 seconds to make a decision and avoid collision. The zone of greatest collision hazard changes with relative aircraft speed. The distance at which a pilot can see another aircraft depends upon the size of the other airplane, the amount of daylight, and the glare from the sun. Seven miles is the approximate maximum distance for spotting a small to medium size aircraft, only under the following conditions: it is daylight, the pilots eyes are focused for distant vision, there is high brightness contrast between aircraft and background, and the pilot is looking directly at the other aircraft.

8090

Hasbrook, A. H.,
J. T. Paim, and H. R. Guggenheimer
Av-CIR CRASH SURVIVAL STUDY: U. S. ARMY BELL H-13 ACCIDENT AT MONMOUTH COUNTY AIRPORT, BELMAR, N.J. JUNE 21, 1956.—Cornell Univ. Aviation Crash Injury Research, Ithaca, N. Y. (Contract Nonr-401(21)). Report no. Av-CIR-5-CSS/H-31, Feb. 1957. 31 p. AD 129 743

UNCLASSIFIED

Photographs with descriptive captions relating to crash-survival details of a Bell H-13 helicopter crash involving a minimum vertical impact speed of 41 miles per hour and not less than a calculated 28.5 g vertical deceleration—in which two crew members survived without spinal injuries—are presented. An accident diagram and the damage to the cockpit, seats and other components are shown; the injuries sustained by the occupants—and the probable injury causes—are described. The method of calculating the crash forces is demonstrated. In addition, the significance of the lack of spinal injuries in an accident involving heavy vertical crash loads is discussed in relation to the design of aircraft seats. (Authors' abstract)

8091

Hasbrook, A. H.
CRASH INJURY RESEARCH: A MEANS OF GREATER SAFETY IN AIRCRAFT ACCIDENTS.—Jour. Aviation Med., 28 (6): 541-552. Dec. 1957. DLC (RC1050.A36, v. 28)

The need for crash-injury investigations of survivable type aircraft accidents, in combination with detailed structural, medical and pathologic studies, is reviewed. In addition, the results of past crash-injury investigations, and their use in the design of present propeller driven, and future jet transports are discussed. Similarly, several recent accident investigations, one, of a helicopter, are reviewed, and pertinent crash-injury findings are shown to illustrate the engineering-medical information which can be extracted from such crashes for the benefit of future design. (Author's summary)

8092

Jones, Edward R.,
and C. A. Garrett
ANALYSIS OF TRAINING REQUIREMENTS FOR ACCIDENT PREVENTION IN A JET AIRCRAFT.—Air Force Personnel and Training Research Center. Operator Lab., Randolph Air Force Base, Tex. (Project no. 7716, Task no. 57050). Technical Memorandum no. OL-TM-57-15, Oct. 1957. iii+31 p. AD 159 941 PB 133 071

An analysis of accidents that occurred in the F-86D, a high performance jet aircraft, was made to obtain information which could be used to design

flight simulators and in conducting training programs that would be more effective. Training in the procedures to cope with emergencies, which has received most emphasis in cockpit procedure trainers and simulators, is important. However, there seems to be a need for integrated training which involves the interpretation of cues and an understanding of the decision making process within the total flight situation as well as procedure training *per se*. Cockpit procedure trainers do not seem adequate for integrated training in accident prevention with single-place jet aircraft. (From the authors' summary)

8093

Jones, G. Melvill

[DISORIENTATION DUE TO A RAPID ROTATION IN FLIGHT (CAUSE OF AN UNEXPLAINED ACCIDENT)] Désorientation due à une rotation rapide en vol (cause d'accident inexpliqué).—Force aérienne, Service de santé, Bulletin technique d'information [Bruxelles], 1957 (Dec.): 10. In French. DNLM

Difficulties in piloting due to disorientation resulting from loss of control during a simple and rapid spin of the aircraft are classified into three principle categories: (1) those produced when flight changes are too fast to be followed by a human operator, (2) those due to the physical violence of the maneuver, and (3) those due to disorientation of the normal neuromuscular mechanisms caused by vestibular stimulation. Disorientation is considered a significant factor in unexplained aircraft accidents.

8094

Knoepfel, H. K.

ACCIDENT PRONENESS AND NEUROSIS.—In: The first European congress of aviation medicine, p. 171-176. Aeromedica acta (Soesterberg, Netherlands), Special edition, 1957. In English. DNLM

Statistical evidence pointing to the existence of an accident-prone personality as a distinct psychological entity is cited. The underlying neurotic structure exhibits traits of impulsiveness, compulsion to act, resentment and rebellious attitude toward authority, casual and superficial interpersonal relationships, and tendency to break away under a conflict, which may become dangerous in a flight situation. Psychoanalytic treatment has been successful. A case history is described, where it was possible to ground an accident-prone individual in the latter half of his flight training after a series of pilot errors before a more serious accident occurred. The clinical impression was supported by Rohrschach and Thematic Apperception Test data. The subject refused psychotherapy.

8095

Konecni, E. B.

PHYSIOLOGIC FACTORS IN AIRCRAFT ACCIDENTS IN THE U. S. AIR FORCE.—*Jour. Aviation Med.*, 28 (6): 553-558. Dec. 1957. DLC (RC1050.A36, v. 28)

A comparison is made between major aircraft accidents in the Air Force in 1955 and 1956. The various physical and physiological factors causing the accidents are given. The incidents increased from 311 in 1955 to 477 in 1956, and 45% of the increase was due to in-flight fires. Other factors showing increases were noxious fumes, noise, vertigo (disorientation), and g forces. These factors occur most frequently in fighter aircraft. Decreases in physiological factors as causes of accidents are noted in hypoxia, fatigue, and inadequate nutrition.

8096

Kylstra, J.

[PROTECTION OF AIRCRAFT PASSENGERS FROM THE CONSEQUENCES OF ACCIDENTS] Bescherming van de inzittenden van luchtvaartuigen tegen de gevolgen van ongevallen.—*Aeromedica acta* (Soesterberg, Netherlands), 5: 271-280. "1956/57". In Dutch. DNLM

Common causes of injuries in flight accidents are flying objects, deformation of aircraft parts, sudden acceleration and deceleration forces, and impact of bodies or limbs on solid aircraft parts. Based on industrial and air force experiments, requirements are discussed for the construction of crash helmets, safety belts, seats and their placement, resilient padding of all projecting surfaces, and placement of loose objects within the cabin.

8097

Lawton, W. H.

PHYSIOLOGICAL INVESTIGATIONS IN THE FLYING SAFETY PROGRAM OF THE FLYING TRAINING AIR FORCE.—*U. S. Armed Forces Med. Jour.*, 8 (7): 937-944. July 1957. DLC (RC970.U7, v. 8)

The accident rate in the Flying Training Air Force dropped from 56.2 per 100,000 flying hours in 1951 to 10.4 per 100,000 in 1956. Three factors appear to be responsible for this decrease. First, with the introduction of the Near Accident Report in 1952 pilot observations were carefully studied and used to more advantage than the fatal accident reports. Secondly, information from the Near Accident Reports led to the realization of the effects of hyperventilation and hypoglycemia in many of the accidents. This enabled a plan to be formed for the education and protection of the pilots against these hazards. Thirdly, a program was installed to improve the eating habits of the pilots. Both the pilots and their wives were educated as to the dangers of an inadequate diet. In conclusion it appears that the much overlooked effects of hyperventilation and hypoglycemia, may now be taken into account in the selection and evaluation of student pilots.

8098

Leeuwe, H.

[THE IMPORTANCE OF TOXICOLOGICAL INVESTIGATIONS AFTER AIRPLANE ACCIDENTS] L'importance des recherches toxicologiques après les accidents d'aviation.—*Aeromedica acta* (Soesterberg, Netherlands), 5: 417-419. 1956/57. In French. DNLM

It is believed that many of the unexplained aircraft accidents may be due to various types of poisoning including poison fumes of gas, hydraulic oil, and lubricants. Examples of near-fatal accidents are cited to show this. The author believes that after fatal accidents a complete toxicological investigation should be made. A discussion is given concerning the difficulties of analysis and the problem of applying standard contamination limits to aviation.

8099

Lomonaco, T.

[SOME CAUSES ACCOUNTABLE FOR FLIGHT ACCIDENTS] Alcune cause alle quali addebitare gli incidenti di volo.—*Rivista di medicina aeronautica* (Roma), 20 (2): 187-198. April-June 1957. In Italian, with English summary (p. 196). DLC (RC1050.R56, v. 20)

Experiments showed that both hyperventilation and noise cause a delay in reaction time to light stimuli, and an impairment in the uniformity of a subjects' responses. An analytical review of approximately 300 tests of tolerance to decompression carried out with jet pilots showed a decreased resistance in subjects who spent the night before the test without sleep and engaged in exhausting activities. Under the same conditions, the same subjects tested for a second time following a night of rest showed normal tolerance. It is concluded that hyperventilation, noise, and lack of rest represent factors able to impair physio-psychic efficiency in flight and possibly cause unclassified flight accidents. (Author's summary, modified)

8100

Lomonaco, T.

[NECESSITY FOR A CENTRAL MEDICAL ORGANIZATION TO STUDY THE PREVENTION OF FLIGHT INCIDENTS AND OF THE DEATHS RELATED TO THEM] Necessità di un organo sanitario centrale destinato allo studio della prevenzione e deletalizzazione degli incidenti di volo.—*Rivista di medicina aeronautica* (Roma), 20 (4): 591-600. Oct.-Dec. 1957. In Italian, with English summary (p. 599).
DLC (RC1050.R56, v. 20)

A proposal is made for the establishment of a central medical organization, composed of specialists in aviation, occupational, and legal medicine, to study the causes of flight accidents by investigating psychophysical deficiency of the pilots and of flying or ground personnel responsible for flight safety. It would also evaluate severe body lesions resulting from aircraft accidents and suggest measures for their prevention and fatal outcome. This organization may find its place at the Center of Studies and Research of Aviation Medicine.

8101

McFarland, R. A.

THE ROLE OF HUMAN FACTORS IN ACCIDENTAL TRAUMA.—*Amer. Jour. Med. Sci.*, 234 (1): 1-27. July, 1957. DLC

A comprehensive study is made of accidental trauma as a problem in the field of preventive medicine. Included in this study is a consideration of aircraft accidents and the human factors involved as possible causative agents.

8102

Mason, J. A.

[THE UNEXPLAINED ACCIDENT, SOME PROBLEMS OF POSTMORTEM DIAGNOSIS] L'accident inexpliqué, quelques problèmes de diagnostic "post-mortem".—*Force aérienne, Service de santé, Bulletin technique d'information* [Bruxelles], 1957 (Dec.): 13-15. In French. DNLN

One of the most important methods which permit the anatomopathologist to shed some light on the pilot involved in an unexplained fatal aircraft accident is to demonstrate certain lesions which possibly caused him to become incapacitated during flight. Coronary disease, perforation of peptic ulcer, and decompression sickness are considered as contributing factors in unexplained aircraft accidents.

8103

Moseley, H. G.

AEROMEDICAL INVESTIGATION OF AIRCRAFT ACCIDENTS.—*Inst. Aeronaut. Sci.* (New York), Preprint no. 672. Jan. 28-31, 1957. [16] p.
DLC (TL507.I55, no. 672)

Also published in: *Aeronaut. Engin. Rev.*, 16 (8): 74-76. Aug. 1957. DLC (TL501.A326, v. 16)

The aeromedical investigation of an aircraft accident is concerned with discovering the causes of injury and determining the human acts which may have led to the accident. Investigation of injury requires careful inquiry into cause and effect, detailed examination of forces and objects which produced injury, and a review of the protective devices which prevented or failed to prevent injury. Since human error may have led to the accident, the cause of such error is also to be investigated. This entails an evaluation of adverse physical or physiological influences (hypoxia, disorientation, environmental adversities, inexperience, behavior problems), a full appraisal of the pilot's clinical history, and, on occasion, careful pathological inquiry. (Author's conclusions, modified)

8104

Moseley, H. G.,

and V. A. Stembridge

THE HOSTILE ENVIRONMENT AS A CAUSE OF AIRCRAFT ACCIDENTS.—*Jour. Aviation Med.*, 28 (6): 535-540. Dec. 1957. DLC (RC1050.A36, v. 28)

Abridged version published in: *Force aérienne, Service de santé, Bulletin technique d'information* [Bruxelles], 1957 (Dec.): 11. In French. DNLN

The frequency of the causative events in aircraft accidents in the U. S. Air Force is divided into three categories: unsafe acts (58%), unsafe conditions (28%), and cause undetermined (14%). In a tabulation of the physical and physiologic factors governing the pilot's environment which may lead to an aircraft accident, these adversities are responsible for many of the "unsafe acts" accidents and probably play a leading role in many of the "cause undetermined" accidents. Particular consideration is given to four major problem areas: the adversity of space, the adversity of altitude, the adversity of velocity, and the adversity of intolerance. The areas demanding attention and which are the most promising of reward, indicate the necessity for a thorough study of: (1) the pilot's environment, (2) the pilot's actions, (3) cockpit factors, and (4) pathologic investigation. When confronted with a "cause undetermined" accident, the aeromedical specialist should consider it due to an environmental or physiologic adversity until proven otherwise.

8105

Moseley, H. G.

PILOT ERRORS TOP USAF ACCIDENT CAUSES —*SAE Journal*, 65 (3): 30-32. Feb. 1957.
DLC (TL1.S5, v. 65)

Pilot error accidents are analyzed using the following conditions affecting the human operator: (1) physical condition, (2) physiological tolerances, and (3) psychological or behavioral variances. The majority of pilot error accidents are found in behavior standards. This is because flying is so absolutely dependent upon the pilot's ability to perceive, decide, and react in a manner which will not only make the aircraft respond to his decisions, but maintain it in flight and bring it to a safe landing during preoccupations and distractions. Inadequate knowledge or experience, application and attitude irregularities, deficiencies in aids to flying, and complications and distractions constitute the major reasons why a pilot errs. Supervisory and maintenance errors are generally due to rapid turnover,

low aptitudes, and lack of interest in personnel. These human errors present a problem for those engaged in the medical and allied sciences, for those who educate, for those who supervise the flier.

8106

Navarro Montolíu, J.

[HUMAN ERROR AND AIRCRAFT ACCIDENTS] El error humano y los accidentes aéreos.—Ciencia aeronáutica (Caracas), 3 (32): 59-60. July 1957. In Spanish. DLC-Per

Pilot errors responsible for aircraft accidents are classified as either physical, psychological, or technical. Technical errors may result from psychophysiological causes such as fatigue, anguish, preoccupation, disgust, or irritability. Although errors may be related to the pilot's health and experience, consideration must be given to errors resulting from complicated machinery which requires constant vigilance and concentration thereby producing nervous irritation, anxiety, and alarm during flight. Periodic medical examination of pilots and flying personnel is recommended in order to assess their physical aptitude and professional competence.

8107

O'Donnell, W.

AIRLINE ACCIDENT RECORD FOR '56 BETTER THAN '55.—Amer. Aviation, 20 (24): 76, 79-80. April 22, 1957. DLC (TL501.A675, v. 20)

Domestic and international operators completed the year 1956 with a fatality rate below one per 100 million passenger miles for the fifth successive year. Four accidents accounted for a total of 156 passenger and crew fatalities, two below the toll for 1955. Domestic carriers accounted for all of these fatal accidents. According to Civil Aeronautics findings, three of the four accidents during the year were probably caused by human factors. Such factors include uncoordinated emergency action in the very short time available to the crew, incorrect analysis of control difficulty, and the accidental opening of the main cabin door in flight by a passenger. Safety records for the U. S. helicopter services and the Military Air Transport Service are described.

8108

O'Donnell, W.

NEW ANTI-COLLISION LIGHTS WIN PILOTS' FAVOR.—Amer. Aviation, 20 (25): 34, 37. May 6, 1957. DLC (TL501.A675, v. 20)

A new concept in aircraft exterior lighting was flight-demonstrated for the first time in Washington, D. C. The light was invented by Northeast Airlines pilot, H. William Atkins, and it appears to be gaining favor with air safety officials. It departs from conventional lights in that it is white and gives positive directional indications. Basically, the Atkins light uses a combination of three flashing Xenon condenser discharge strobe units. One light flashes forward, another to the side, and another to the rear. The forward-facing light flashes 160, the side light 80, and the rear light 40 times a minute. The differential in flashing time allows the pilot of another aircraft to determine the direction of flight of the plane and its relative position.

8109

Perdriel, G.

[OPHTHALMOLOGICAL ASPECTS OF THE PROB-

LEM OF PREVENTING COLLISIONS IN FLIGHT]

Aspects ophtalmologiques du problème de la prévention des collisions en vol.—Médecine aéronautique (Paris), 12 (4): 229-348. 1957. In French, with English summary (p. 348).

DLC (TL555.M394, v. 12)

The pilot's ocular reactions are involved in the prevention of aircraft collisions. These hinge on visual acuity, accommodation, morphoscopic and stereoscopic sensitivity, and recognition time during both diurnal and night vision. Psychosensory aniseikonia and scotopic vision increase the risks of collision as do physical conditions within the aircraft (lack or excess of light), and some sensory illusions. In order to decrease the risks of collision in flight, it is suggested that external and internal aircraft design be improved, electronic detector devices be used, and greater attention be given to the supervision and selection of flying personnel.

8110

[Phillimore, H. J.]

BRITISH CRASH TIED TO LAX CHECK FLIGHTS.—Aviation Week, 67 (25): 85-87, 89, 91, 93-95. Dec. 23, 1957. DLC (TL501.A8, v. 67)

A British Air Ministry transport accident investigation is described of the crash of a Viking twin-engined aircraft during a landing attempt on May 1, 1957. Thirty-four of the 35 persons aboard the aircraft were killed. The cause of the accident is attributed to the failure of the pilot to maintain height and a safe flying speed when approaching to land on one engine after failure (or suspected failure) of the port engine due to some cause which cannot be ascertained. Various suggestions are offered with particular reference to six-monthly checks for pilots.

8111

Porton, W. M.

[AVIATION MEDICINE AND FLIGHT ACCIDENTS] Luchtvaartgeneeskunde en vliegongevallen.—Nederlands militair geneeskundig tijdschrift ('s-Gravenhage), 10 (5): 137-145. May 1957. In Dutch. DLC (RC971.N4, v. 10)

Physiological factors which have been directly or indirectly implicated in aircraft accidents are reviewed, e.g., hypoxia, hypoglycemia, hyperventilation, pressure breathing, hyperthermia alone or in combination with g forces, vertigo and disorientation, impaired cerebral circulation, syncope brought about by light flicker of certain frequencies, etc. Other pathological conditions are frequently caused by (1) alcohol intake before flight with subsequent hangover, (2) influenza regardless of its severity, and (3) poisoning with CO₂, CO, and other toxic agents escaping from aircraft fuels. Aeroembolism and syncope also constitute a problem. Certain prophylactic and therapeutic measures are suggested.

8112

Rémond, A.

[UNRECOGNIZED LOSS OF CONSCIOUSNESS AS A POSSIBLE CAUSE OF UNEXPLAINED ACCIDENTS] Les pertes de connaissance occultes, causes possibles d'accidents inexplicables.—Médecine aéronautique (Paris), 12 (2): 125-142. 1957. In French, with English summary (p. 141-142).

DLC (TL555.M394, v. 12)

Abridged version published in: Force aérienne, Service de santé, Bulletin technique d'information [Bruxelles], 1957 (Dec.): 8-9. In French. DNLML

Occult unconsciousness may be caused by (1) abnormal sensory sensitivity (photogenic epilepsy, reflex epilepsies), (2) psychomotor epilepsy, (3) syncope and lipothymia, (4) paroxysmal sleep, and (5) paroxysmal coma. The possible occurrence of these manifestations indicates the necessity for their systematic diagnosis and prevention. In flying personnel or ground crew, whose jobs involve great responsibilities, routine electroencephalography is included in the initial selection procedure. Specialized periodic medical examinations are given which simulate a particular stressful situation and constitute an additional selection device. Subjects with a history of accident in or out of the service, especially where head injuries are involved, are carefully examined. The following are looked for: unknown cerebral cause of the accident, or possible brain injury resulting from the accident which could result in a certain impairment of the central nervous system. Development of a warning device is recommended to alert crew members of dangerous functional impairment of the individual in a vital situation. The device may be based on a mechanism which produces an automatic counteraction set in motion by an abnormal electroencephalogram or electrocardiogram.

8113

Senegas, R.,
and G. Cantoni

[CONTRIBUTION TO THE STUDY OF ACCIDENTS OF UNDETERMINED ORIGIN WITH EMPHASIS ON THE IMPORTANCE OF THE PILOT-AIRPLANE COMPLEX] Contribution à l'étude des accidents d'origine indéterminée mettant en valeur l'importance du complexe "pilote-avion".—*Médecine aéronautique* (Paris), 12 (2): 143-149. 1957. In French, with English summary (p. 149).

DLC (TL555.M394, v. 12)

Out of 177 single-seater jet-plane accidents which occurred during 1954-56, 10 were of unknown cause. These cases were characterized by loss of control of the aircraft during which the pilot did not eject himself or decided to eject too late. Ninety percent of the accidents were related to high-altitude hypoxia which produced physical or psychomotor dysfunction, or to defective cabin pressurization. The frequency of accidents survived on certain types of aircraft demonstrates the importance of the pilot-aircraft complex in the origin of accidents of undetermined cause. The risk varies according to such factors as pilot experience or use of the ejection seat. Loss of control results from dissociation of the pilot-airplane complex, which is a momentary disadaptation of man and machine.

8114

Smith, Russell J.

WHY DO THEY CALL IT PILOT ERROR?—*Combat Crew (Strategic Air Command)*, 8 (1): 9-11. July 1957. DLC (UG633.A15, v. 8)

Pilot errors leading to an accident may be attributed to one or more of the following reasons: physical condition, error of judgment, poor technique, carelessness, negligence, disobedience of orders, and lack of experience. Securing all available facts and analyzing the events leading to an accident is the job of the Air Force accident board, a group of seasoned pilots qualified to judge the actions of the crew involved. Many pilot-error accidents have their foundation in poor supervisory decisions which allow the pilot to be confronted with an overwhelm-

ing series of adverse circumstances. Eliminating needless risks is an important means of preventing accidents.

8115

Talbot, J. M.

[THE UNEXPLAINED ACCIDENT IN THE U.S. AIR FORCES-EUROPE] L'accident inexpliqué dans l'US Air Forces-Europe.—*Force aérienne, Service de santé, Bulletin technique d'information* [Bruxelles], 1957 (Dec.): 16. In French. DNLM

A questionnaire of 862 pilots in the United States Air Force in Europe indicated that accidents occurring during flight were due to hypoxia, hyperventilation, rapid or explosive decompression, decompression sickness, and vertigo of the pilot. In major aircraft accidents, hypoxia and vertigo were the major causes. It is suggested that flying personnel be furnished with adequate protective equipment during flight.

8116

Touch, A. G.

GROUND CONTROL FAULTY IN VULCAN CRASH.—*Aviation Week*, 66 (10): 111-112, 115, 119-120, 123, 125, 127, 129-130, 132. March 11, 1957.

DLC (TL501.A8, v. 66)

Descriptions are given of various phases of an investigation of a Vulcan aircraft accident at London Airport, October 1, 1956. Ground Controlled Approach (GCA) was the system used to direct the approach operation. Significant conclusions are: (1) there was no malfunctioning or failure of the GCA equipment, and (2) the controller failed to warn the pilot of his closeness to the ground (the most likely theory for this is that the controller made an error of judgment, concentrating too much upon azimuthal correction, and paying insufficient attention to the elevation error-meter). However, it is suggested that the controller not be held to blame since the approach was subject to the overriding judgment of the pilot. A GCA system is recommended in which the controller observes both sets of displays (eliminating the need for a tracker); if GCA is to continue as a primary approach aid (as distinct from a monitor), photographic recordings of displays should be carried out.

8117

Townsend, F. M.

THE PATHOLOGIC INVESTIGATIONS OF AIRCRAFT ACCIDENT FATALITIES.—*Jour. Aviation Med.*, 28 (5): 461-468. Oct. 1957. DLC (RC1050.A36, v. 28)

The contribution of the pathologist in discovering the cause of accidents or fatalities in flight and in propounding their prevention is discussed. Environmental factors, traumatic factors, and factors of pre-existing disease which are important to the pathologist's investigations are discussed in detail by the use of five case histories. A discussion is given of the Air Force procedures and regulations for the Medical Investigation of Aircraft Accident Fatalities.

8118

Townsend, F. M.,

V. A. Stembridge, and F. K. Mostofi
THE ROLE OF THE PATHOLOGIST IN AIRCRAFT ACCIDENT INVESTIGATIONS.—*Inst. Aeronaut. Sci.* (New York), Preprint no. 673, Jan. 28-31, 1957. [18] p. DLC (TL507.I55, no. 673)

Abridged version published in: *Aeronaut. Engin. Rev.*, 16 (7): 65-67. July 1957.

DLC (TL501.A326, v. 16)

The current status of aviation pathology and its related disciplines was brought into focus by the scientific session of the Joint Committee on Aviation Pathology, November 1956. Deliberations and discussions fell into 4 general categories: (1) the findings from cases analyzed by pathologists to date, (2) a consideration of new techniques that may be useful in the study of postmortem material, (3) an analysis of experimental procedures, and (4) a consideration of clinical observations and the application of laboratory techniques to their evaluation. When investigating aircraft fatalities three factors must be kept in mind by the pathologist. These are environmental factors, traumatic factors, and pre-existing disease. An instructive case is presented as to what possibly may be learned from examination of small tissue fragments recovered from a fatal aircraft accident. Pathologists will be of great value to the aircraft-accident investigating team.

8119

VERTIGO/DISORIENTATION.—Tactical Air Command Surgeon's Bull. (Headquarters Tactical Air Command, Langley Air Force Base, Va.), 7 (2): 14-17. Feb. 1957. DNLN (W2.A4.T13S)

A review of human factors involved in major aircraft accidents for the period of January-September 1956, reveals that vertigo and/or disorientation accounted for 32 of the 116 major accidents. Most typical cases of vertigo are transient and usually of short duration and consists of illusions of pitch, sensations of turning while in straight and level flight and vice versa. These are usually overcome by strict instrument interpretation. The Coriolis reaction, however, is more dangerous and causes more severe reactions in pilots leading to uncontrollable flight situations immediately after changing radio channels.

8120

VICTIM'S OWN ERROR HELD AS CAUSE OF FALL.—*Aviation Week*, 66 (13): 107-108. April 1, 1957. DLC (TL501.A8, v. 66)

A Civil Aeronautics Board investigation is described of an accident in which a passenger fell to his death through the main cabin door from an altitude of 6,500 feet, near Shelby, North Carolina, on June 13, 1956. Findings indicate that: (1) the parent company, the aircraft, and the crew were currently certified; (2) turbulence was not a factor in the accident; (3) the cabin door was closed, latched, and inspected by the crew before departure; (4) there was no failure or malfunction of the main cabin door; (5) passenger Pruitt left his seat to go to the lavatory, accidentally opened the cabin door, and fell to his death through the opening; (6) the purser was temporarily absent from the cabin in the performance of his duties; and (7) the interior of the door was not placarded or otherwise safeguarded against inadvertent opening, nor is this required.

8121

VISUAL FAILURE BLAMED IN CANYON CRASH.—*Aviation Week*, 66 (19): 113, 117-119, 122-126, 131, 133-134, 139-140, 143-144. May 13, 1957. DLC (TL501.A8, v. 66)

A Civil Aeronautics Board accident investigation report is presented of the collision between a Trans World Airline Lockheed 1049A and a United Air Lines

Douglas DC-7 at about 21,000 feet over Grand Canyon, Arizona, June 30, 1956. There were no survivors among the 128 persons aboard the flights, 70 aboard TWA and 58 aboard United. Evidence suggests that the mid-air collision resulted from any one or a combination of the following factors: intervening clouds reducing time for visual separation, visual limitations due to cockpit visibility, preoccupation with normal cockpit duties, preoccupation with matters unrelated to cockpit duties such as attempting to provide the passengers with a more scenic view of the Grand Canyon area, physiological limits to human vision reducing the time opportunity to see and avoid the other aircraft, or insufficiency of en route air traffic advisor information due to inadequacy of facilities and lack of personnel in air traffic control.

8122

Webb, W. B.,
E. E. Miller, and L. M. Seale
FURTHER ATTEMPTS AT CODING AIRCRAFT ACCIDENTS.—Naval School of Aviation Medicine, Pensacola, Fla. (Project no. NM 15 01 11, Subtask 1). Report no. 2, July 31, 1957. UNCLASSIFIED

The accuracy of attempts to devise categories for the coding of accidents has been low. This study was confined to one specific accident event, the carrier landing phase of flight training, and the codes were derived from intensive follow-up interviews with accident participants. Thirty-eight pilot-caused accidents were independently coded by three coders using five psychological categories. Four separate coding sessions were held. Preceding each coding session the codes were thoroughly discussed. The coding procedures developed showed little or no improvement over previous attempts at coding accidents. The major difficulty in accurate coding seems to lie in the fact that an error may stem from any one of a number of psychological sources. Further, neither the mental state nor the specific motor acts of the pilot during the time of the accident were available to the coder. (Authors' abstract)

8123

Webb, W. B.,
J. R. Berkshire, and I. J. Goodman
PRE-SOLO FLIGHT GRADES AND CARRIER LANDING ACCIDENTS OCCURRING IN TRAINING.—Naval School of Aviation Medicine, Pensacola, Fla. Special Report no. 57-21, July 29, 1957. ii+4 p. AD 154 631 UNCLASSIFIED

A relation between pre-solo flight grades and carrier landing accidents was established. A concept of accident causation was derived which suggests that most accidents occur independently of the aptitudes of the pilot but that a proportionately few accidents can be attributed to pilot ineptitude or accident proneness. The analysis procedure for identifying this small group of pilots would appear to call for the use of a low-end cutoff procedure, in contrast to more classical group differences measures. (From the authors' summary)

8124

WHERE WAS THE FLIGHT SURGEON?—Far East Air Forces Command Surgeon's Newsletter, 3 (3): 5-7. April-May 1957. DNLN

A fatal accident is reported where the pilot experienced spatial disorientation which resulted in loss of control when he was forced to transition to instru-

ments. An understanding of spatial disorientation by pilots is recommended in order to prevent such accidents. Included are incidents of hypoxia which occurred on a routine flight during the climb when the cabin pressurization system failed at 10,000 feet. As the pilot continued to climb, a crew member became hypoxic while checking the cabin pressurization valves after disconnecting his mask. While the co-pilot aided the hypoxic man, the pilot climbed to approximately 28,000 feet and the aircraft began to spin. With the aid of the co-pilot an uneventful landing was accomplished. Investigation revealed that the pilot became hypoxic due to a deteriorated mask.

8125

Zeller, A. F.,

and H. G. Moseley

AIRCRAFT ACCIDENTS AS RELATED TO PILOT AGE AND EXPERIENCE.—*Jour. Aviation Med.*, 28 (2): 171-179. April 1957. DLC (RC1050.A36, v. 28)

An evaluation of the available data showing the relation of pilot age and experience to aircraft accidents indicates that either limited experience or younger age is associated with high accident potential, and that with advancing age and/or increasing experience this accident potential decreases. By far the greatest gains in accident prevention can be made by reducing the accidents of the younger, less experienced pilots, especially those flying jet aircraft. This can be partially accomplished by greater emphasis on training and by more careful supervision of the flying activities of these pilots. It is anticipated that recent modifications in the training program will contribute to a decrease in the accidents in these early age groups. (Authors' summary, modified)

8126

Zeller, A. F.

SEARCH FOR HUMAN CAUSES OF AIRCRAFT ACCIDENTS.—*Skyways*, 16 (8): 18, 36. Aug. 1957. DLC (TL501.S634, v. 16)

The human element is the critical factor in the majority of aircraft accidents and it is through a clear understanding of human factors that the greatest number of accidents can be potentially prevented. The following elements are discussed as they relate to aircraft accidents: human variables, man-machine concept, action resulting from information and decision, human limitations, background of the pilot and sources of information for a particular flight, and pilot decision and action. Diligent efforts in the direction of defining and isolating the human factors as they relate to accidents may ultimately result in the successful definition of not only what happened but why it happened and how future human-failure accidents can be prevented.

g. Meteorites and Aerospace Debris

8127

Langton, N. H.

METEORS AND SPACEFLIGHT.—*Spaceflight* (London), 1 (3): 92-100. April 1957.

DLC (TL787.B725, v. 1)

Chance of a dangerous collision occurring between a meteorite and a spaceship is very small, because meteorites large enough to cause damage are few and far between, and a spaceship would be a relatively small target. In journeys lasting several days

or several weeks, the chance of collision with a meteorite larger than a grain of sand is extremely small (probabilities are tabulated). Bumper screens may be used to prevent such small meteorites from damaging the hull. Vehicles remaining in space indefinitely are more prone to collisions with larger meteorites. Since weight would not pose a problem, thicker bumper screens may be used, being brought up in sections from the Earth. Another feasible method of protection would be to throw out of the artificial satellite any unwanted or worn-out equipment. This could be tethered so that it remained near the satellite, acting as a bumper screen. Figures relating to meteorites, mechanical and thermal penetrations are tentative, pending further research.

8128

Ovenden, M. W.

METEOR HAZARDS TO SPACE STATIONS.—In: *Realities of space travel*, p. 217-230. Ed. by L. J. Carter. London: Putnam, 1957.

DLC (TL790.A1B718)

[This is a reprint of an article which appeared in: *Jour. Brit. Interplanetary Soc.* (London), 10 (6): 275-286. Nov. 1951.] The danger of a spaceship colliding with a meteor is not serious for short interplanetary trips; however, a more serious hazard is presented to permanent orbital structures such as space stations. The degree of danger depends upon the thickness and strength of the hull and the average number of hours between hits. These are plotted against hull thickness for dural and stainless steel. A life time of one year is seen to demand a hull thickness of 0.15 cm. dural or 0.06 cm. stainless steel. Protection may be obtained by surrounding the vessel with a thin sheet of material to act as a meteor bumper. Included are Grimmer's tabulation of collision probabilities, and tabulation of the properties of major meteor showers encountered by the earth.

h. Other Hazards

8129

MOBILE FOAM GENERATORS MAKE POSSIBLE CONTROL OF CRASH FUEL FIRES FOR FEW VITAL MINUTES.—*Amer. Aviation*, 21 (1): 37. June 3, 1957. DLC (TL501.A675, v. 21)

New fire fighting equipment developed by the Boeing Airplane Co.'s Wichita Division is described as a technique capable of getting quick, temporary control of aircraft crash fires where large amounts of fuel are involved. It consists of high-capacity mobile foam generators which facilitate gain of complete control over fires for a minimum of two or three minutes, or long enough for the rescue of all crew members and passengers.

8130

Osten, R. van

FIRE SAFETY TESTS FOR JETS NEEDED NOW.—*Amer. Aviation*, 21 (2): 89. June 17, 1957.

DLC (TL501.A675, v. 21)

Data are presented from addresses given to the National Fire Protection Association's annual aviation seminar in Los Angeles, Calif. These data relate to fire safety tests and procedures needed to combat the complexity of future jet transport hazards. It is suggested that the development of non-flammable fuels and lubricants is of vital importance. Other items that should be developed are: airborne vapor

detection devices, reliable fire detection methods for power plant areas, automatic discharge systems for extinguishing agents, and fireproof wiring coatings and instrumentation systems to evaluate firefighting methods without setting the ship on fire. New fields requiring study for their influence on fire safety are

listed. Vapor problems during ground refueling, the necessity of replacing fuel trucks with hydrant systems, problems in the use of existing fire truck equipment, evacuation schedules and equipment for passengers, rescue techniques, and some military experience with fires in jet aircraft are discussed.

11. MAN-MACHINE INTEGRATION AND LIFE SUPPORT SYSTEMS

a. General

8131

Beller, W.

FOR FUTURE FLYING: FEWER HUMAN FACTORS.—*Amer. Aviation*, 20 (21): 41-42. March 11, 1957. DLC (TL501.A675, v. 20)

Air Force research aims to reduce pilot decision-making in high-speed flight. Pilots are having trouble enough holding on to Mach 1 planes. When higher Mach planes are operational, pilots will have an impossible control job unless rudder and stick are replaced by automatic equipment. These observations stem from the increasing emphasis that the military and industry are placing on man-plus-machine or human-factors problems. Human factors development and research in the Air Force are described. A typical human factors department currently being expanded at the Martin Co., Baltimore, Md., is also described. Human factors' work is expected to result in the development of more efficient weapon systems, in decreased training time of systems operators, and in increased safety of aircraft.

8132

Coons, D. O.

HUMAN FACTORS APPROACH TO THE DEVELOPMENT OF AN AIR-WEAPON SYSTEM.—*Canad. Services Med. Jour. (Ottawa)*, 13 (6): 345-348. June 1957. DNLM

The integration of a ground-based system of radar and its data-linking apparatus with the air-frame power plant, armament, and the man presents a multitude of technical difficulties and has given rise to a new approach called the weapon system development. It is possible to reduce the effect of the physiological and psychological stresses imposed on the aircrews by high-speed, high-altitude flight by: (1) selecting men for the work who can be imbued with better than average tolerance or resistance to the stresses; (2) providing men with some degree of protection from the stresses in the form of personal equipment; and (3) compromising with the designers of the performance characteristics of the vehicle with due regard for man's ability to tolerate the stresses. To achieve such goals, a coalition was made of technological and biological scientists, referred to as the human factors group.

8133

Coons, D. O.

WHY THE MAN?—*Canad. Services Med. Jour. (Ottawa)*, 13 (6): 363-364. June 1957. DNLM

With the advent of electronic automaticity, the possibility of removing man entirely from the air weapon system is considered. This is not an acceptable solution since man has attributes which have not yet been synthesized electronically. The first of these is the ability to make a decision through the exercise of judgment and respond to training in making the right decision. Man's unpredictability is another asset because his actions cannot be anticipated by an enemy. Electronic unpredictability is synonymous with electronic failure. Thirdly, man can differentiate between friend or foe. Electronic shortcomings (maintenance, massiveness of equipment, temperature and pressure intolerance of equipment) make it mandatory for man to take over manual control.

8134

Cooper, G. E.

UNDERSTANDING AND INTERPRETING PILOT OPINION.—*Aeronaut. Engin. Rev.*, 16 (3): 47-51, 56. March 1957. DLC (TL501.A326, v. 16)

The expression and interpretation of pilot opinion in determining important design decisions of new aircraft lies in the formulation of the proper question or task to be asked the pilot. Also considered are such factors as the pilot's present viewpoint, background, experience, and adaptability. Ground simulators in conjunction with a human pilot are valuable tools for evaluating a particular airplane or control system characteristic, but, because of the actual danger of making invalidating assumptions, it is important that the test pilot share the responsibility for their design and use.

8135

Crossfield, A. S.

SPACE TRAVEL, A SYMPOSIUM: A TEST PILOT'S VIEWPOINT.—*Jour. Aviation Med.*, 28 (5): 492-495. Oct. 1957. DLC (RC1050.A36, v. 28)

In order to test something it is necessary to have a specific design to carry out a specific purpose. The considerations for design of a vehicle whose purpose is to orbit the Earth at several hundred miles altitude are given. The concern of the test pilot in a mission such as this is discussed as to physiological conditions, propulsion and power control, problems of navigation and communication, control and stability of the craft, adequate instrumentation, and methods of survival in case of accidents.

8136

Ely, J. H.,

H. M. Bowen, and J. Orlansky
MAN-MACHINE DYNAMICS.—Dunlap and Associates, Inc., Stamford, Conn. (Contract AF 33(616)-419); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio (Project no. 7180, Task no. 71501). WADC Technical Report no. 57-582, Nov. 1957. vi+113 p. AD 131 082 PB 131 576

This report identifies and discusses factors affecting human performance in tracking and in watchkeeping (vigilance) tasks, and makes recommendations toward improving the performance of such systems. Whenever these recommendations are the direct outgrowth of published research, the appropriate studies are cited. Other recommendations have been developed by the authors from their own experiences. The report is divided into three main parts: General Information, Important Design Factors in Closed-Loop Systems, Human Time Lags. A table of contents and a subject index are provided. (Authors' abstract) (116 references)

8137

Estes, H. D.

SELECTION AND THE MAN-MACHINE COMPLEX.—In: Symposium: physical standards and selection, p. 154-158. Randolph Air Force Base, Tex.: Air University, 1957. AD 144 144 UNCLASSIFIED

A selection system is strongly dependent upon all other activities in the field of aviation medicine.

When the Air Force is able to select, not a group of supermen, but a cross section of good sound American boys and train them to be entirely satisfactory masters of the man-machine complex, we will have reached our ideal. Of course, this time will never come because it would mean we would have solved all our problems—medical, technical, and operational. However, short of this ideal, let us always realize that we are compromising. Each compromise involves not just a man but the man-machine complex. We should take the initiative to minimize the compromise by striking at the weakest point in the system, whether that point be in the man, in the machine, or in some operational requirement of the combination. (Author's conclusions)

8138

Ford, A.

FOUNDATIONS OF BIOELECTRONICS FOR HUMAN ENGINEERING.—Navy Electronics Lab., San Diego, Calif. NEL Research Report no. 61, April 4, 1957. ii+119 p. AD 145 734 UNCLASSIFIED

A survey is presented of 614 formal and informal studies prepared to assist the Navy Electronics Laboratory (NEL) in applying bioelectronics to several of its problems by providing data to eliminate overlap of new NEL projects with work being done elsewhere and emphasizing safe biological techniques and avoiding unsafe ones. The survey consists of the following 16 chapters: (1) The viewpoint in engineering, (2) Amplitude and frequency of bioelectric signals, (3) Organized bioelectric facility, (4) Bioelectric components: electrodes and transducers, (5) Bioelectric components: amplifiers and recorders, (6) The human transmission system, (7) Bioelectric scoring and control, (8) Effort, fatigue, rest, and sleep, (9) Physical work and manual skills, (10) Normal mental work, (11) Emotional stress in mental work, (12) Unfavorable special environmental conditions, (13) Injury, drug effects, and pathology, (14) Bioelectrical aspects of vision, (15) Applications to human engineering, and (16) Summary of bioelectrical applications to human engineering. A bibliography of 614 references and author and subject indexes are included.

8139

Henry, J. P.,

G. A. Eckstrand, R. R. Hessberg, D. G. Simons, and P. P. Webb

HUMAN FACTORS RESEARCH AND DEVELOPMENT PROGRAM FOR A MANNED SATELLITE.—Air Research and Development Command. Human Factors Directorate, Baltimore, Md. Report no. ARDC TR 57-160, Oct. 1957. iii+4 p. AD 136 410

UNCLASSIFIED

Discussion is made of the present status of human-factors research and the future trends in this area. Attention is directed to such factors as: habitable atmosphere, acceleration, weightlessness, thermal effects, water, nutrition, waste disposal, radiation, escape, isolation and confinement, presentation and processing of information, workplace layout, crew skills, selection and training, and motivation. Present capability permits providing a functioning man in flight for two hours (one circumnavigation of the earth). The types of support and research needed to increase this capability to 12 hours within one or two years are indicated.

8140

Kobrick, J. L.

QUARTERMASTER HUMAN ENGINEERING HANDBOOK SERIES. III. DIMENSIONS OF THE LOWER LIMIT OF GLOVED HAND SIZE.—Quartermaster Research and Development Center. Environmental Protection Research Div., Natick, Mass. (Project no. 7-83-01-004). Technical Report no. EP-43, Feb. 1957. xiv+185 p. AD 137 961 UNCLASSIFIED

This report presents human engineering information on the hand dimensions of the soldier wearing various ensembles of Quartermaster protective handwear. It should prove useful to engineers and designers as a handbook for establishing size and space allowances in the design and sizing of hand-operated equipment. The criterion used is the point below which the smallest five percent of hand sizes fall; therefore, the data are concerned with the lower limit of hand size. The information is presented in pictorial form with index scales, so that dimensions can be measured on the pictures and referred to the index scale to establish actual size. (Author's abstract)

8141

Kobrick, J. L.

QUARTERMASTER HUMAN ENGINEERING HANDBOOK SERIES. IV. DIMENSIONS OF THE LOWER LIMIT OF BODY SIZE OF THE ARCTIC SOLDIER.—Quartermaster Research and Development Center. Environmental Protection Research Div., Natick, Mass. (Project no. 7-83-01-004). Technical Report no. EP-51, April 1957. vi+83 p. AD 142 864

PB 132 438

This report presents human engineering information on the body size of the soldier clothed in the full Arctic uniform. It should be used as a handbook by engineers and designers for establishing space allowances in the design and sizing of man-operated equipment. The criterion used is the point below which the smallest five percent of body sizes fall; therefore, the data are concerned with the lower limit of body size. The information is presented in pictorial form with index scales, so that dimensions can be measured on the pictures and referred to the index scale to establish actual size. (Author's abstract)

8142

Kurata, M.

FIT THE MACHINE TO MAN.—Jour. Sci. and Labour (Tokyo), 33 (8): 589-594. Aug. 1957. In Japanese, with English summary (p. 589). DNLM

Three methods are needed to remedy decreased productivity associated with a man-machine system: fit the man to the machine, fit the machine to man, and fit the job to man. Ergonomics is the basic area of applied science concerned with the stress-strain problems of man at work. American engineers have organized a committee on ergonomics to develop human data for use by design engineers and to show the practical usefulness of this study in the solution of important human problems. In England, the Ergonomics Research Society was formed to bring together biological and physical scientists concerned with the study of man at work and with the application of ergonomic principles to the design of work facilities and organizations. (Author's summary, modified)

8143

Lansberg, M. P.

THE FUNCTION OF THE VESTIBULAR SENSE

ORGAN AND THE CONSTRUCTION OF A SATELLITE.—In: The first European congress of aviation medicine, p. 69-77. *Aeromedica acta* (Soesterberg, Netherlands), Special edition, 1957. In English.

DNLN

Essentially the same as item no. 4499, vol. IV.

8144

Lund, M. W.

MAN'S ABILITIES IN A MILITARY SYSTEM.—Office of Naval Research, Research Rev., 1957 (Oct.): 16-19.
DLC (Q180.U5A354, 1957)

Consideration of man's abilities within a military-system setting gives some insight into ways in which he can best serve as a component. For example, he can be used effectively for any and all of the following functions: as a receiver, as a computer or evaluator, and as a controller. Specific reference to man's limitations is not made because whether or not he will be a decrement in a system depends on what he is required to do. In the future considerably more systems complexity can be anticipated and man's function will no doubt change. However, the problems of monitoring and maintenance will remain. In fact, the design of future systems must be even more sensitive to human factors than those of the past have been.

8145

McCormick, E. J.

HUMAN ENGINEERING.—xi+467 p. New York, etc.: McGraw-Hill Book Co., 1957.

DLC (TA175.M3, 1957)

This book covers various phases of human engineering and emphasizes the contribution of psychology to it. Although it is not intended to be a complete handbook of human-engineering data, materials from the more important areas are presented. These include the following: light and seeing, illumination, visual displays, color, sound and hearing, auditory communications, noise and its effects, atmospheric conditions, body orientation and acceleration forces, human motor activities (speed and accuracy), human motor activities (strength and force), space requirements, design and arrangement of controls and displays, arrangement of equipment, and human beings in relation to equipment. An appendix is included with two sections, the first listing source materials, and the second bibliographies. An author and a subject index are also appended. (409 references)

8146

Mayo, A. M.

[THE HUMAN FACTOR IN ROCKET AND MISSILE CONTROL] Le facteur humain dans la conduite des fusées et engins téléguidés. — Médecine aéronautique (Paris), 12 (2): 175-179. 1957. In French.

DLC (TL555.M394, v. 12)

The role of the human brain in aircraft instrument and control systems to improve performance in manned vehicles and guided missiles is discussed. The superior characteristics (decision-making, application of memory data, greater number of computational cells, aspirations and goals of its owner) and the limitations (prone to error, slow in simple arithmetic problems, tires quickly, has a slow response and a slower output system) of the human brain are compared with those of a machine system, and a systematic mutual supplementation and linkage between man and machine is proposed.

8147

Mayo, A. M.

SPACE TRAVEL, A SYMPOSIUM: SOME SURVIVAL ASPECTS OF SPACE TRAVEL.—*Jour. Aviation Med.*, 28 (5): 498-503. Oct. 1957.

DLC (RC1050.A36, v. 28)

A discussion is presented of various aspects of space survival including high-speed automatic control systems, a hermetically sealed environment, protection against leaks in the craft due to meteorites, escape problems in flight, and acceleration problems in re-entry. The need to link the human to the automatic controls in the most efficient and reliable way is emphasized. Space travel will necessitate that food, oxygen, and water be supplied by algae, artificial photosynthesis, or by waste reconversion. Means of protecting the craft from meteorites by shielding with self-sealing surfaces are discussed. Escape from the craft is related in stages of takeoff, free space flight, and re-entry and landing. Use of a separate crew compartment, deceleration devices, an escape vehicle, and parachutes are discussed as methods of escape.

8148

Meyer, A. F.

AVIATION MEDICINE AND THE INDUSTRIAL HYGIENE ENGINEER.—*Jour. Aviation Med.*, 28 (4): 417-420. Aug. 1957.

DLC (RC1050.A36, v. 28)

Many scientific and technical skills are required in the solution of problems involving "human engineering," but the contribution the industrial hygiene engineer is capable of making in this aspect of aviation medicine is only beginning to be recognized. Industrial hygiene engineers, in addition to their engineering training, have specialized knowledge and experience with regard to the physiologic effects of exposure to physical, chemical, and biologic adverse factors in the environment. They also have specialized skills in the design of control measures for noise, ionizing radiation and exposure to hazardous chemicals as well as abnormalities of temperature, illumination and pressure. Some recent applications of these skills are described. The need for a co-operative effort among all of the disciplines involved is emphasized. (Author's summary)

8149

Ogle, D. C.

MAN IN A SPACE VEHICLE.—*U. S. Armed Forces Med. Jour.*, 8 (11): 1561-1570. Nov. 1957.

DLC (RC970.U7, v. 8)

A discussion is presented of the problems that will confront man in space travel. Space travel will require research in many scientific fields. Biochemical and biophysical studies of the central nervous system will be especially important. Physiological studies of the effects of gravitation and acceleration are needed as well as studies on the maintenance of the environment in space. Space hazards such as cosmic radiation and the danger from meteorites are discussed. The method of selecting the best possible personnel will be done on the basis of these studies, and the best emotionally and physically adapted individuals will be chosen.

8150

Rappaport, M.

HUMAN ENGINEERING, AN AID TO IMPROVING

ELECTRONIC EQUIPMENT. — IRE Trans. Indus. Electronics, PGIE-4: 6-11. March 1957.

The applied experimental psychologist, or human engineer, can be of great assistance in the design, production, and maintenance of simple or complex electronic equipment. By his knowledge of human sensory and motor characteristics, by systematic application of fundamental principles of psychology, physiology, and anthropometry, and by application of psychophysiological research techniques to man-machine problems, he can contribute to the development of compatible and more efficient man-machine systems. In many applications, reduction of human factor errors can be as important as the reduction of electromechanical errors. (Author's abstract)

8151

Roebuck, J. A.

ANTHROPOMETRY IN AIRCRAFT ENGINEERING DESIGN. — Jour. Aviation Med., 28 (1): 41-56. Feb. 1957. DLC (RC1050.A36, v. 28)

The purpose of this paper has been to demonstrate requirements for an integrated, practical approach to the problem of economically providing space for human operators and passengers within the limitations of aircraft design. The emphasis has been laid on the importance of means of communication of anthropometric data to engineers, in terms of design applications. Standardization of data accumulated from diverse sources and development of some detailed statistical techniques have been discussed. It is the author's hope that the foregoing will encourage more thorough engineering consideration of human space needs for greater comfort and efficiency, and in so doing help point out areas for exploration by statisticians, anthropologists, and other workers concerned with human factors. (Author's conclusion)

8152

Sinaiko, H. W.,

and E. P. Buckley

HUMAN FACTORS IN THE DESIGN OF SYSTEMS. — Naval Research Lab., Washington, D. C. (Projects no. NR 402-000 and NR 402-006). NRL Report no. 4996, Aug. 29, 1957. iv+49 p. AD 143 053

PB 131248

This report is intended for the designer of systems incorporating men as operators, maintainers, or monitors of machines. It delineates the characteristics of men and the system design considerations which result from them. The following five areas are covered: (1) the human component and the process of designing systems; (2) a summary of the characteristics of the human component with implications for design engineering; (3) the effects of human characteristics upon engineering tests and system evaluations; (4) an annotated reading list of 92 references; and (5) a checklist of human factors considerations in system design evaluation.

8153

Smith, R. A.

THE MANNED SATELLITE STATION. — In: Space research and exploration, p. 125-133. Ed. by D. R. Bates et al. London: Eyre & Spottiswoode, 1957.

DLC (TL790.B3)

A manned satellite station will be of great value to world weather studies and will provide the exper-

imental conditions, such as zero gravity and temperature extremes, for physiological space research. Structural requirements for an acceptable design of the station must consider the peculiar conditions of illumination, temperature and atmospheric pressure regulation, and the creation of a reasonable type of living environment. The structure must also be rigid enough to withstand stresses imposed upon it by correctional maneuvers without undue flexure and must be able to withstand centrifugal and gyro-precessional forces. Bombardment by meteors and the hazards of cosmic radiations must also be taken into consideration. The station will need to be maintained by a regular ferry service to compensate for the steady rate of use of expendable stores, and to provide the relief crews required.

8154

Sweeney, R.

GREATER HUMAN FACTORS EMPHASIS ASKED BY NAVY SAFETY EXPERT. — Aviation Week, 67 (7): 33. Aug. 19, 1957. DLC (TL501.A8, v. 67)

Reports are given of four papers presented at the meeting of the Institute of Aeronautical Sciences in San Diego, Calif. relating to cockpit problems, warfare analysis, fatigue failure in aircraft, and the Navy's safe service life program for its aircraft. Problems in present cockpit instrumentation, involving attitude indicators, noise within the airplane, altimeters, and personal equipment, are outlined and human engineering is suggested as being the remedy.

8155

Westbrook, C. B.,

and D. T. McRuer

AIRCRAFT HANDLING QUALITIES AND PILOT RESPONSE CHARACTERISTICS. — North Atlantic Treaty Organization. Advisory Group for Aeronautical Research and Development, Report no. 125, May 1957. v+21 p. DLC (TL500.N614)

The evolution of handling qualities requirements in the United States Air Force is traced. By means of a number of examples it is shown that pilot opinion upon which "classical" handling qualities are based is in reality a subjective expression of the overall suitability of a pilot-airframe system. The research program of the Air Force to determine the dynamic characteristics of the human pilot is reviewed. The ultimate purpose of this program is the application of human response data and servo analysis techniques to the design of overall systems incorporating such elements as the airframe, control system, pilot, displays, etc. Some of the recent results of correlation work to these two approaches to handling qualities, the subjective or pilot opinion method and the direct or servo technique, are given. (Authors' abstract)

b. Operational Aspects

8156

Arner, R. S.

SOME VISUAL PROBLEMS OF FLIGHT. — Amer. Jour. Optometry, 34 (5): 233-240. May 1957.

DLC (RE1.A37, v. 34)

An analysis of certain visual problems during piloting is presented. Airmen must have reasonably good visual acuity and be free from any major defects, but the overemphasis on stereopsis and color vision, for example, is not necessary. Protection of dark adaptation and the effects of hypoxia and explo-

sive decompression on vision are discussed. The effects of motion and acceleration are reviewed. Current problems in new aircraft concerning windshield design and lighting are pointed out. The use of eye glasses and contact lenses, and the problem of increased speed in flight with the inherent perceptual and motor lags are discussed. The skill of the optometric graduate can be and is being utilized to solve some of these problems.

8157

Barr, N. L.,

C. J. Kube, J. J. Morgan, A. Mediate, M. Yarczower, B. B. Shepp, and P. C. Gustafson
A FIELD EVALUATION OF A SYSTEM FOR PREDICTING VISUAL RANGE.—Naval Medical Research Inst., Bethesda, Md. (BU AER Project Order no. 71704-56). Research Report no. NM 18 01 00.02.01 (Vol. 15, p. 843-872), Nov. 20, 1957. AD 159 849

UNCLASSIFIED

Knowledge of the visual range is of prime importance for the pilot attempting to land under marginal weather conditions. This paper reports the results of a field evaluation of a system for predicting visual range. Observers in a boat viewed balloon targets (of varying reflectivities) against the horizon sky. At the same time, measurements were obtained with respect to the brightness of the horizon sky, the brightness of the target, the attenuation coefficient, and also the actual distance of the boat from the target. The boat proceeded away from the target until none of the observers could see it. The boat then reversed course and proceeded toward the target until all of the observers could see the target. Standard statistical and psychophysical methods of analysis were performed on the data. The results indicated that the prediction equation did not adequately predict visual range under the experimental conditions. (From the authors' abstract)

8158

Blackwell, H. R.

OPTICS AND VISION.—Univ. of Michigan Engineering Research Inst., Ann Arbor. Report no. 2144-184-P, Nov. 1957. ix+17 p. AD 149 866

UNCLASSIFIED

The study, development, and tests of illumination, optical, electro-optical, and physiological aids to visual surveillance are described. Consideration is also given to the development and tests of improved visual and photographic surveillance procedures, and improved battle-area illumination techniques. Investigations are presented of studies leading to the construction of visibility-forecasting charts. These involve the basic aspects of visual surveillance: (a) target and background characteristics; (b) optical properties of the atmosphere; and (c) operating characteristics of the eye. (From the author's abstract)

8159

Campbell, P. A.

SOME UNSOLVED PROBLEMS IN AVIATION OTOLARYNGOLOGY.—Annals Otol. Rhinol. and Laryngol., 66 (3): 790-796. Sept. 1957.

DLC (RF1.A6, v. 66)

The major problems in aviation medicine since the inception of World War II still occur, but their magnitude and scope have changed. Aero-otitis media, aero-sinusitis, and air sickness, major problems then, are now well managed. Noise

which is a serious problem now has not as yet been readily controlled. Use of protective devices often hinders personnel in their jobs, but protection by selection and proper assignment of personnel has helped. Problems of the space age such as methods of producing weightlessness, spatial orientation, and problems of closed ecological systems are discussed.

8160

Coles, W. D.,

and E. E. Callaghan

FULL-SCALE INVESTIGATION OF SEVERAL JET-ENGINE NOISE-REDUCTION NOZZLES.—National Advisory Committee for Aeronautics, Washington, D. C. Technical Note no. 3974. 45 p. April 1957.

DLC (TL521.A35, no. 3974)

A number of nozzles which use the mixing interference of adjacent jets for noise suppression were investigated. Reduction in sound power of nearly 70% (5 decibels) with thrust losses of 1% were achieved. Maximum sound-pressure level was reduced by as much as 18 decibels in particular frequency bands. Some nozzles showed considerable spatial asymmetry, that is, the sound field was not rotationally symmetrical. A method of calculating the limiting frequency affected by such nozzles is presented. Data are shown which appear to indicate that further reductions in sound power will not be easily achieved from nozzles using mixing interference as a means of noise suppression. (Authors' summary, modified)

8161

Coles, W. D.,

and W. J. North

SCREEN-TYPE NOISE REDUCTION DEVICES FOR GROUND RUNNING OF TURBOJET ENGINES.—National Advisory Committee for Aeronautics, Washington, D. C. Technical Note no. 4033. 23 p. July 1957.

DLC (TL521.A35, no. 4033)

Previously reported advantages of screens placed across the jet as a means of suppressing jet noise during ground running were somewhat offset by increased noise levels ahead of the engine. This was overcome by a combination screen and muffler which effectively eliminated these increases and gave substantial additional suppression throughout the sound field. Maximum sound pressure levels at 200 feet were reduced to 104 decibels (a 16-decibel reduction), and the overall sound power was reduced by 12 decibels. Reductions of at least 4 decibels and as much as 17 decibels were obtained in the spectrum power levels. Air-jet tests showed negligible reduction in sound generation with additional screens. Both air-jet and engine tests showed airfoil-vane jet diffusers to be less effective than screens. (From the authors' summary)

8162

Dwiggins, R. D.

FACTORS AFFECTING SIGNALING BY VISUAL METHODS.—Naval Ordnance Lab., White Oak, Md. NAVORD Report no. 6034, Dec. 19, 1957. iii+15 p. + 11 figures. AD 162 931

UNCLASSIFIED

The use of visual methods to convey information over relatively large distances has long been practiced. The effectiveness of signaling by these methods depends, fundamentally, upon the physical nature of the signal, the transparency of the atmosphere, the ambient illumination, and the physiological and psychological response involved in seeing. These

broad factors are analyzed and discussed in terms of their individual components. This information is presented on the following topics: (1) characteristics of the eye and the seeing process, (2) the effect of brightness contrast on visibility thresholds, (3) luminance thresholds for various colors, (4) relative effectiveness of point sources over diffuse light, (5) values of background luminance under various natural conditions, and (6) the relative effectiveness of a flashing light versus a steady light as a signal. (Author's abstract)

8163

Eastman, F.

AIRLINES SAY JET NOISE TO BE CUT TO REASONABLE LEVEL BY 1959.—Aviation Week, 66 (19): 47. May 13, 1957. DLC (TL501.A8, v. 66)

A report is presented of the latest developments and results of tests made in noise control as outlined at a meeting of the Ground Equipment and Maintenance Facilities Subcommittee of the Air Transport Association, held in Chicago, Ill. The major problem is the need for additional suppression of jet engine noises in the maintenance run-up areas where full power may be applied for short periods of time. Jet engines are scheduled to be equipped with suppressors to reduce noise during normal operation. Another problem may be the high-frequency noise from the engine air intake when running at low speeds, such as taxiing to and from airport gate positions. In some cases, exhaust blasts may also create a problem. Various methods developed to eliminate these problems are described, including their efficiencies and inconveniences.

8164

FIVE-YEAR PLAN FOR MODERNIZING AIRWAYS GOES TO CONGRESS.—Amer. Aviation, 20 (25): 39-40. May 6, 1957. DLC (TL501.A675, v. 20)

An expanded and expedited five-year program developed by the Civil Aeronautics Administration (CAA) for modernizing the nation's air traffic control system to meet the jet age has been submitted to Congress. This plan places continued emphasis on radar as the best available solution to the traffic control problem. Radar will provide greater safety through positive separation of aircraft by electronic visual means. The plan is designed to give CAA controllers the eyes to control traffic en route and during landing and ground operations in terminal areas. Estimated outlay required for the jet-age program is \$2.4 billion, including \$810 million for equipment alone.

8165

Gardner, J. F.,

R. J. Lacey, C. M. Seeger, and J. E. Wade
IN-FLIGHT COMPARISON OF PILOT PERFORMANCE ON A STANDARD USAF AND AN EXPERIMENTAL INSTRUMENT PANEL.—Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio (Project no. 7189-71571). WADC Technical Report no. 57-270, Sept. 1957. v+18 p. AD 118 255 PB 131 652

Six USAF pilots each flew forty-eight Instrument Landing System (ILS) approaches. Each pilot flew twenty-four approaches using a standard Air Force instrument panel configuration and twenty-four approaches using an experimental panel that employed an aircraft reference type presentation that used the "principle of the moving part." For each series of

24 ILS approaches, half were flown using the ID-249 cross-pointer type instrument, and half were flown using a Zero Reader instrument for primary glide path and localizer information. It was hypothesized that pilots, although experiencing some difficulty with the experimental instrument panel at first, would quickly adapt to this type of presentation and ultimately would perform better with the experimental panel than with the standard type presentation. The results were inconclusive and did not lend unqualified support to the above hypothesis. (From the authors' abstract)

8166

Gerathewohl, S. J.

[THE DEVELOPMENT OF VISUAL LANDING AIDS FOR HIGH-PERFORMANCE AIRCRAFT] Die Entwicklung visueller Landehilfen für Hochleistungsflugzeuge.—Zeitschrift für Flugwissenschaften (Braunschweig), 5 (7): 189-198. July 1957. In German, with English summary (p. 189)

DLC (TL503.W557, v. 5)

Improvements in the visual landing aids are discussed in view of a more wide-spread use of high-performance aircraft and their operation under all weather conditions. The aim is to reduce and eventually dispense with the minimum visibility limits. The systems at present in use do not afford precision guidance to the touchdown point at zero visibility. This can be accomplished by improvement of the airfield lay-out, electronic and automatic landing aids, improvement of display and guidance controls, and by the development of new visual aids on the ground. The basic principles of an integrated electronic and visual landing system are discussed. Some suggestions are made for the construction of some new types of landing aids, their standardization, and for the development of a combined system for straight-in approaches under non-emergency, emergency, and bad-visibility conditions. (Author's summary, modified)

8167

Gierke, H. E. von

AIRCRAFT NOISE SOURCES.—In: Handbook of noise control, 33-1 to 33-65. Ed. by C. M. Harris. New York: McGraw-Hill Book Co., 1957.

DLC (TA365.H3)

The characteristics of sound sources and noise fields of aircraft propellers and reciprocating engines, jet engines, helicopters, and support equipment to which men around aircraft are exposed are described and measured. Consideration is given to suppression of these sources of noise either by devices (mufflers, test cells, screening walls, etc.), configurations, modifications in engine design, and planning of airports and communities with respect to aircraft noise. Also included are calculated noise charts from aircraft noise sources. (118 references)

8168

Hicks, S. A.

LITERATURE REVIEW: TRACKING CONTROL MECHANISMS AND DISPLAYS (LIGHT ANTIAIRCRAFT SYSTEM ORIENTED).—Aberdeen Proving Ground. Army Ordnance Human Engineering Lab., Md. Technical Memorandum no. 9-57, Dec. 1957. ii+13 p. AD 158 179 UNCLASSIFIED

This report presents a review of the literature dealing with tracking (general), control systems,

display systems, compensatory vs. pursuit tracking, and auditory vs. visual displays. It is intended to have the design of fire control systems for low altitude antiaircraft weapons. (Author's abstract) (46 references)

8169

HUGHES SILENCER CUTS JET NOISE IN HALF.—

Amer. Aviation, 20 (26): 45. May 20, 1957.

DLC (TL501.A675, v. 20)

The Hughes Aircraft Co. has completed tests of a new-type sound suppression chamber expected to reduce noise in nearby residential areas by 50%. The suppressor is being used to reduce jet engine noise from 5 types of all-weather interceptors assigned to the company for testing prototype airborne control systems for defense aircraft at Culver City, Calif. Engineers state that the sound produced by Convair's F-102A with afterburner is reduced from 160 to less than 95 decibels. The Hughes silencer is different from suppressors used by other aircraft companies in that it can be adapted for use with more than one type of jet.

8170

Kagan, M. S.

[RESULTS OF INVESTIGATIONS ON CONDITIONS OF THE EYES IN PERSONNEL OPERATING A RADIOLOCATION SYSTEM FOR AIRPLANE LANDINGS] Rezul'taty issledovaniia sostoiianiia organa zreniia u personala radiolokatsionnoi sistemy posadki samoletov. — Gigiena truda i professional'nye zabollevaniia (Moskva), 1 (6): 54-57. Nov.-Dec. 1957. In Russian. DNLML

Work in the air-traffic control tower was not found to produce any changes in vision. Subjective symptoms and certain functional changes were attributed to fatigue resulting from improper work distribution.

8171

Kurke, M. I.,

and C. N. McCain

LOW POWER OPTICAL SYSTEMS AND AERIAL TARGET DETECTION.—Aberdeen Proving Ground, Army Ordnance Human Engineering Lab., Md. (Project no. TB1-1000). Technical Memorandum no. 5-57, June 1957. ii+14 p. AD 140 912 PB 130 411

Several monocular optical systems were investigated both at Aberdeen Proving Ground, Maryland, and at Yuma Test Station, Arizona, to determine minimum visible thresholds in detecting airborne targets. In general, an inverse relationship was found to exist between threshold and magnification. The purpose of the Yuma Study was to determine the minimum magnification necessary for detection of aircraft targets at a range of 10,000 yards. The 3x optics met this criterion, but the results of the Aberdeen Study, which was initiated to examine in isolation some of the findings derived from the Yuma Study, support the feelings of the present investigators that 2-1/2 power would be comparable at the required range. An investigation of empty field myopia indicated that this phenomenon did not affect target detection under the conditions studied. (Authors' abstract)

8172

Mason, R.

WHAT DID HE SAY?—Flying Safety, 13 (6): 6-8. June 1957. DLC (UG633.F43, v. 13)

With high-speed aircraft less time is available for the pilot to make decisions and pass pertinent information on to the crew members. Failure to communicate effectively may lead to indecision, delay, failure to accomplish vital procedures, errors in procedural or emergency techniques, and panic within the aircrew. Errors resulting from such discrepancies generally fall into three categories, namely, insufficient, excessive, or misinterpreted communication. Typical cases of aircraft accidents resulting from insufficient or inadequate communication are presented where the pilot was either the silent type, too busy to talk, a feather-head, or panicked.

8173

Miller, L. N.,

and L. L. Beranek

COMPARISON OF THE TAKE-OFF NOISE CHARACTERISTICS OF THE CARAVELLE JET AIRLINER AND OF CONVENTIONAL PROPELLER-DRIVEN AIRLINERS. — Jour. Acoust. Soc. Amer., 29 (11): 1169-1179. Nov. 1957.

DLC (QC221.A4, v. 29)

A comparison was made of the noise produced by the French jet aircraft, the Caravelle, with that produced by conventional propeller-driven airliners in terms of the following noise factors: (1) relative noise levels, (2) duration of noise, and (3) frequency distribution of noise. Noise level measurements were made under the take-off path at various distances from the beginning of the runway. The conclusion was drawn that the comparative noise levels of the Caravelle, when considered in terms of probable response of listeners to the spectrum distribution of the noise, are approximately equal to those of large propeller aircraft for similar climb rates when heard out-of-doors. Second, the Caravelle noise levels, based on relative listener response, are somewhat lower than those of propeller aircraft when heard in-doors or when the Caravelle is permitted to take off under steep climb conditions. Third, the Caravelle noise persists for longer time intervals than does propeller aircraft noise by a factor of between 1.5 and 3.5, depending upon the distance from the runway. (Authors' abstract, modified)

8174

Miller, L. N.,

and L. L. Beranek

SURVEY OF THE TAKE-OFF NOISE CHARACTERISTICS OF THE CARAVELLE JET AIRLINER AND OF CONVENTIONAL PROPELLER-DRIVEN AIRLINERS.—Noise Control, 3 (6): 42-47, 70. Nov. 1957. DLC (TA365.N6, v. 3)

This is an analysis of the noise associated with take-off and climb-out operations of conventional four-engine propeller-driven aircraft and the French twin-engine jet airliner "Caravelle". (1) The Caravelle produced different noise levels dependent on various take-off procedures; (2) for all take-off procedures, the Caravelle noise levels were considerably lower than those of conventional aircraft in the low-frequency bands; and (3) for relatively steep climb take-offs, the Caravelle noise levels were comparable to those of large propeller-driven aircraft in the high-frequency bands. Figures illustrate take-off conditions, noise levels at take-off, duration of noise, and aircraft noise levels inside buildings.

8175

Moseley, H. G.

LOST HORIZONS.—Flying Safety, 13 (11): 2-4.

Nov. 1957. DLC (UG633.F43, v. 13)

In flying, when the direction of gravity is changed continually, pilots encounter various sensations (vertigo) arising from the unusual stresses and strains put upon the senses of pressure and equilibrium. Vertigo is responsible for many aircraft accidents. False sensations in flight may consist of unperceived motion; sensations of climbing, diving, or tilt; degree of bank and unperceived banks; or optical illusions from clouds. In order to avoid vertigo the pilot is advised to rely on instruments rather than on his sensations, know the false sensations of flight and be able to identify them, and keep his head up and locked during instrument flight.

8176

Neely, K. K.,

R. E. F. Lewis, and W. D. MacNamara

DESIGN OF CONSOLES AND VOICE COMMUNICATION SYSTEMS FOR AERODROME CONTROL TOWERS.—Canad. Aeronaut. Jour. (Ottawa), 3 (1):

17-20. Jan. 1957. DLC (TL501.C2713, v. 3)

The number of channels guarded in control towers will be markedly increased with the introduction of ultrahigh frequencies. The resulting problems were considered and air traffic control procedure and voice communication systems were studied. A mock-up of a control tower and associated control consoles was then made and various arrangements and designs were tried out. The resulting design of control consoles and voice communication equipment for use in control towers is reported and principles are stated for the guidance of control tower planners. (Authors' summary)

8177

Nicely, P. E.,

and G. A. Miller

SOME EFFECTS OF UNEQUAL SPATIAL DISTRIBUTION ON THE DETECTABILITY OF RADAR TARGETS.—Jour. Exper. Psychol., 53 (3): 195-198. March 1957. DLC (BF1.J6, v. 53)

The effect of unequal distribution of targets on radar performance was studied with a standard radar display or with photographic presentation of the display. A progressive decline was observed in the detection of targets presented in an area of the screen having a low probability of target appearance. Detection of targets in the high-probability area remained relatively constant throughout the 90-minute experimental period. More targets were detected with the photographic display, but the frequency of false reports was much higher.

8178

Nikitin, I. M.

[ANALYSIS OF WRONG ACTIONS OF THE PILOT LEADING TO PLANE "BOUNCING" FROM THE GROUND DURING THE LANDING] Opyt analiza nepravil'nykh deistvii pilota, privodiaschikh k ot-khodu samoleta ot zemli pri posadke.—Voenno-meditsinskii zhurnal (Moskva), 1957 (2): 78-79. Feb. 1957. In Russian. DLC (RC970.V55, v. 1957)

The bouncing of the plane during the landing is very dangerous and represents an unbalance between the weight of the plane and its lifting power. As a rule, such bouncing is the pilot's fault, and

is the result of his incompetence, lack of discipline, or miscalculation. Yet, the role of the nervous system of the pilot and external factors are not to be overlooked. It is believed that accidents of this kind can be greatly attributed to peculiarities of the nervous activity in pilot candidates and pilots.

8179

Pietrasanta, A. C.

AIRCRAFT NOISE AND BUILDING DESIGN.—Noise Control, 3 (2): 11-18, 88. March 1957.

DLC (TA365.N6, v. 3)

Engineering procedures are presented for use in analyzing and solving noise problems caused by the interference of jet aircraft noise with speech communication and task performance in nearby office buildings. These procedures utilize information on estimating noise levels from jet aircraft operations and on the application of office noise criteria in intermittent-noise situations. They may be used to either determine the requirements for adequate wall structure, to aid in the selection of a building site or a site for aircraft ground run-up operations, and to evaluate the effect of reorienting ground run-ups and using shielding structures and run-up noise suppressors. Included are representative figures and tables.

8180

PORTABLE JET ENGINE MUFFLER DESIGNED FOR CARRIER SERVICE.—Aviation Week, 66 (14): 74, 76. April 8, 1957. DLC (TL501.A8, v. 66)

A new mobile, light-weight jet engine muffler (designed by Lemmerman, Inc.) for use on aircraft carriers is described which was recently delivered to the U.S. Navy. The units weigh 10,000 pounds and cost approximately \$15,000. Cost of the mobile units can be cut almost in half if the silencer is mounted in a fixed position; if designed to accommodate afterburners, the cost of units increases.

8181

Roby, T. B.,

and J. T. Lanzetta

A REPLICATION STUDY OF WORK GROUP STRUCTURE AND TASK PERFORMANCE.—Air Force Personnel and Training Research Center, Lackland Air Force Base, Tex. (Project no. 7713, Task no. 27101). Research Report no. AFPTRC-TN-57-85, June 1957. vii+12 p. AD 134 205 UNCLASSIFIED

Twelve groups of three men were seated in three open booths placed side by side. Each booth contained two simulated aircraft instruments and two simple switches. The group task was to detect changes in instrument readings, relay the necessary information to the proper individuals, and execute simple switch adjustments based on relay or directly available instrument readings. It was found that the proportion of information directly accessible to a control operator and performance were positively related, and learning was much more rapid with an easy communication system than with a difficult one. Replacing an interphone circuit with a telephone circuit resulted in wider differences in performance and an increase in errors.

8182

Rund, P. A.,

H. P. Birmingham, C. L. Tipton, and W. D. Garvey

THE UTILITY OF QUICKENING TECHNIQUES IN IMPROVING TRACKING PERFORMANCE WITH A

BINARY DISPLAY.—Naval Research Lab., Washington, D. C. (Project no. NA 550-010). NRL Report no. 5013, Sept. 13, 1957. 1+6 p. AD 144 895

PB 128 553

This study investigates the usefulness of a binary display (two lights) where provision is made for additional phase advance beyond that required with a continuous display to provide a fully quickened system. It was found that the additional amount of phase advance resulted in a very respectable tracking performance with the binary display. (Authors' abstract)

8183

Saint, S.

AIRWAYS ARE NOT READY FOR COMMERCIAL

JETS.—Amer. Aviation, 20 (24): 71, 73-74. April 22, 1957. DLC (TL501.A675, v. 20)

Air highways, navigational methods, and air traffic control (ATC) are discussed as they relate to safety during operation of commercial jet aircraft. Although jets will not create new problems, they will sharply increase old ones. Manual radar as we know it today will not stand up under the increasing pressures of the jet age because it will result in complete collapse under peak loads. The future for jet operations can be predicted with near certainty: an increased number of control breakdowns, pilot protests, and rising public clamor all resulting in the application of flow control to preserve a degree of safety. At this point, the airlines and other operators, whose aircraft are losing money waiting their turn in the system, will at long last take a close look at the sorry picture of ATC development.

8184

Schipper, L. M.,

C. L. Kraft, A. F. Smode, and P. M. Fitts

THE USE OF DISPLAYS SHOWING IDENTITY VERSUS NO-IDENTITY: A STUDY IN HUMAN ENGINEERING ASPECTS OF RADAR AIR TRAFFIC CONTROL.—Ohio State Univ. Lab. of Aviation Psychology and Research Foundation, Columbus (Contract AF 33(616)-3612); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio (Project no. 7192). WADC Technical Report no. 57-21, Feb. 1957. v+22 p. AD 110 713 PB 131 270

Evaluations were made of the efficiency of four experienced controllers in an air traffic control system when engaged in a series of simulated return-to-base missions with (a) an omnipresent identity code for all aircraft on the PPI display as contrasted with (b) the absence of coded identity. Continuously identified targets permitted significantly improved system performance at projected rates of entry of 48 and 60 aircraft per hour per controller. At slower rates, the presence or absence of identification had no effect with a futuristic radar and highly skilled controllers. Controllers less experienced with the Ohio State University simulator operation probably would not have performed as well as the slowest rates without identification. Combined savings at the two highest entry rates when targets were identified was of the order of 16% for time and about 10% for fuel.

8185

Seale, L. M.,

and W. A. Wilbanks

THE ABILITY OF NAVAL AVIATORS TO MAKE STARBOARD APPROACH TURNS. I. QUESTION-

NAIRE DATA.—Naval School of Aviation Medicine, Pensacola, Fla. Special Report no. 57-15, June 3, 1957. ii+3 p. AD 143 558 UNCLASSIFIED

Naval aviators (students and instructors) were administered questionnaires to determine if they were having difficulties in making starboard turns to landings in jet aircraft. 6% of the sample stated they were experiencing present difficulty in making starboard approach turns. 28% thought the port turn was easier than the starboard turn. The major difficulties reported by the sample in making a starboard turn are problems centered around maintaining proper rate of turn and altitude control. The effects of these difficulties are felt at the 90° position and the rollout "in the groove". (Authors' summary in part)

8186

SPEED NO PROBLEM IN SUPERSONIC FLIGHT, BUT VISION IS, NAVY F8U PILOTS SAY.—Amer. Aviation, 21 (15): 30. Dec. 16, 1957. DLC (TL501.A675, v. 21)

Interrogation of 23 F8U pilots, aged 23 to 33, disclosed that most of them felt that supersonic speed per se is not too much of a problem. However, all of the pilots agreed that they had visual problems at high altitudes. These problems include such difficulties as inability to pick up another plane at high speeds and altitudes except within a two-mile range as well as difficulties in maintaining flight formations. Aeromedical specialist Ashton Graybiel states that vision at altitudes is a real problem, and space myopia, as it is called, needs further investigation. Differences between the two basic sensory sources for orientation (visual and gravitational) and between older pilots and "tiger types" during supersonic flight are discussed. Fatigue is also discussed as it relates to flying the F8U aircraft. The importance of physical fitness in supersonic aircraft operations is stressed.

8187

Squires, P. C.

NEW DIGIT DESIGNS FOR USE UNDER REFLECTED RED LIGHT OF LOW BRIGHTNESS.—Naval Medical Research Lab., New London, Conn. (Project no. NM 22 02 20, Subtask 2, Report no. 1). Report no. 284 (vol. 16, no. 6), May 20, 1957. iv+11 p. UNCLASSIFIED

A newly designed set of digits uniquely appropriate for use under red light of low brightness levels (especially in connection with rotating dials) is revealed to have a statistically significant superiority in readability over the highly standardized NAMEL (Naval Air Materiel Equipment Laboratory) digits.

8188

Staudte, R. W.

COCKPIT DAZE.—Flying Safety, 13 (6): 13. June 1957. DLC (UG633.F43, v. 13)

An aircraft accident may be caused by fascination of the pilot (cockpit hypnosis, fixation, "asleep-on-the-job"). Two factors are involved: looking at the wrong instrument at the wrong time, and looking at the right object but taking the wrong action or no action at all. Engine drone, a monotonous radio signal, and an empty visual field have a tendency to hypnotize the pilot, particularly on long straight and level flights. Training pilots to develop the habit of attentiveness and alertness is a means of preventing accidents due to fascination.

8189

Todd, J. M.

MANAGEMENT PROBLEMS CREATED BY JET ENGINE NOISE.—Univ. of Texas, Austin. [Unnumbered report], Aug. 1957. ix+88 p. UNCLASSIFIED

This thesis is intended to provide a non-technical treatment of management problems created by jet engine noise. The following areas are surveyed: (1) the development of jet propulsion and related noise problems; (2) effects of jet engine noise on workers; and (3) effects of jet engine noise on community relations. It appears that the solution to management problems created by jet engine noise is based upon: (a) informing the public, (b) improving zoning procedures around airports, and (c) perfecting silencers for jet engines as the ultimate solution.

8190

Whiteside, T. C. D.

TARGET DETECTION AND NUMBER OF OBSERVERS.—RAF Inst. of Aviation Medicine (Gt. Brit.), Farnborough; issued by Flying Personnel Research Committee (Gt. Brit.). Report no. FPRC 1022, Oct. 1957. 3 p. AD 211 028 UNCLASSIFIED

The percentage improvement in the probability of seeing a target as a result of employing two or three observers instead of one is calculated and graphed. Improvement is greatest when the task is difficult and becomes less marked with easier tasks which have a higher probability of success.

c. Instruments and Controls (Including Visual Displays)

8191

Andreas, B. G.,

A. A. Gerall, R. F. Green, and D. P. Murphy
PERFORMANCE IN FOLLOWING TRACKING AS A
FUNCTION OF THE SENSITIVITY OF THE AIR-
PLANE-TYPE CONTROL STICK.—Jour. Psychol.,
43 (2): 169-179. 1957. DLC (BF1.J67, v. 43)

Time-on-target was measured in a pursuit-tracking task in which the ratio of display movement to movement of an airplane-stick control (sensitivity) was varied from 1:1 to 16:1. Performance was found to be uniformly better in subjects using a control stick with lower sensitivity, regardless of improvement with practice. Transfer from a control with high sensitivity to one with lower sensitivity always resulted in an improvement in performance. Positive transfer effects were observed with transfer to a more sensitive control, but performance was always lower than with a less sensitive control.

8192

Beldam, F. E. M.

DEVELOPMENT OF AN OPTIMUM ALTIMETER
DIAL.—Inst. of Aviation Medicine, Toronto, Canada.
Progress Report no. 1. Report no. 57/3, March 15,
1957. [11] p. AD 141 762 UNCLASSIFIED

The dial resulting from this study gives the altitude information required by pilots in a clear, easily read presentation, which requires no computation on the part of the pilot at any time. This presentation removes the possibility of the 1,000 and 10,000 foot errors so common to three-pointer altimeters. An instrument was designed which measures altitude with extremely high accuracy and reliability. (Author's conclusions, modified)

8193

Bessey, E. G.,

and G. S. Machen

AN OPERATIONAL TEST OF LABORATORY DETERMINED OPTIMA OF SCREEN BRIGHTNESS AND AMBIENT ILLUMINATION FOR RADAR REPORTING ROOMS.—Jour. Applied Psychol., 41 (1): 51-52. Feb. 1957. DLC (BF1.J55, v. 41)

The relative efficiency of operational spotting and tracking of radar targets (aircraft) was studied under conditions of (1) no ambient illumination, with the cathode-grid voltage bias of the radar screen set at a level sufficient to produce a just-visible sweep line, and (2) ambient illumination of 0.1 foot-candles, with the grid bias set at 7 volts above that used in condition (1). Both the number of sightings and the distance at which aircraft could be tracked were significantly increased in condition (2).

8194

Bradley, J. V.

CONTROL KNOB ARRANGEMENT CAN SAVE AIRCRAFT INSTRUMENT PANEL SPACE.—Jour. Aviation Med. 28 (2): 322-327. June 1957.

DLC (RC1050.A36, v. 28)

It is found that, of the arrangements compared, economy of panel space and unlikelihood of accidental operation are best combined by using a line of several knobs one-half inch in diameter mounted side by side with three-quarter to one and one-quarter inches between edges. Regardless of the number of knobs involved, this is preferable to using one-inch knobs mounted side by side or shielded knobs mounted on concentric shafts. (From the author's summary)

8195

Bradley, J. V.

DIRECTION-OF-KNOB-TURN STEREOTYPES.

—Wright Air Development Center, Aero Medical Lab., Wright-Patterson Air Force Base, Ohio (Project no. 7182, Task no. 71514). WADC Technical Report no. 57-388, July 1957. iii+11 p.

AD 130 835 UNCLASSIFIED

The human engineering principle that rotary controls should turn clockwise to increase is investigated to determine whether it corresponds to a true "population stereotype" or is simply a convention adopted for purposes of standardization; and, if a stereotype does exist, to determine its nature and how best to exploit it. The principle appears to correspond to a strong population stereotype only when the display indicates changes in the controlled function without visible movement. In other cases, the principle must be considered a design practice or convention which may, in fact, be well learned by highly indoctrinated operators such as military pilots, but which does not correspond to a tendency or stereotype in the general population.

8196

Briggs, G. E.,

P. M. Fitts, and H. P. Bahrick

EFFECTS OF FORCE AND AMPLITUDE CUES ON LEARNING AND PERFORMANCE IN A COMPLEX TRACKING TASK.—Jour. Exper. Psychol., 54 (4): 262-268. Oct. 1957. DLC (BF1.J6, v. 54)

A study was made of the effects of force and amplitude cues from a simulated aircraft control stick on learning and performance in a two-dimensional compensatory tracking task. Groups of sub-

jects practiced for 60 trials with control sticks having (1) force-displacement characteristics approximating those of an interceptor aircraft; (2) the same displacement but 1/4 the total force change; (3) the same force feedback, but 1/4 the amplitude of displacement; or (4) both force and amplitude cues reduced to 1/4. The performance of group (1) was found to be significantly superior to that of other groups, while group (2) was slightly superior to groups (3) and (4). The performance of groups (2), (3), and (4) was affected by both force and amplitude cues and their interaction. When these groups transferred to the condition of group (1), no significant differences were observed among the four groups. It is concluded that the particular combination of force and amplitude cues sets limits on tracking performance, but has little effect on learning of the task.

8197

Burrows, A. A.,
and C. Cameron
THE COMPARISON OF ATTITUDE INDICATORS
USING LIMITED FLIGHT SIMULATION.—RAF Inst.
of Aviation Medicine (Gt. Brit.), Farnborough, and
Royal Aircraft Establishment (Gt. Brit.), Farnbor-
ough; issued by Flying Personnel Research Commit-
tee (Gt. Brit.). Report no. FPRC 973, Dec. 1957.
1+[41] p. AD 209 983 UNCLASSIFIED

Limited though complex aircraft flight simulation was used tentatively to evaluate on performance criteria the relative merits of several attitude displays. The experiment was further designed to yield extensive data for the purpose of developing future display evaluation techniques. Trained pilots, as subjects, were required to "fly" the simulated aircraft from a selection of suddenly displayed attitudes to "straight and level", and their behavior in this task was analyzed. The results give some useful indications of both the dynamic characteristics of the displays under consideration and of potentialities of the technique used. (Authors' summary)

8198

Christian, G. L.
NEW FIRE DETECTION BANS FALSE ALARMS.—
Aviation Week, 66 (11): 97-98. March 18, 1957.
DLC (TL501.A8, v. 66)

Descriptions are presented of a new type of continuous fire and overheat detection system developed by Fenwal, Inc. This new system aims at killing false fire alarms with its feature of heat sensing of temperatures very close ($\pm 5^\circ$ F.) to a predetermined setting regardless of the length of detector exposed to the heat. Fenwal contends that the big spread in alarm-producing temperatures of thermistor-type continuous detector systems is a serious source of false alarms. Thermistor-type continuous detector manufacturers take issue with Fenwal's stand. Some Kidde and Edison manufactured detector systems are also described.

8199

Cohen, J.,
and A. J. Dinnerstein
THE EFFECTS OF FIELD SIZE, LETTER SIZE,
AND CLUTTER ON THE RECOGNITION TIME OF
SELECTED LETTERS [Abstract].—Amer. Psychol-
ogist, 12 (7): 453. July 1957.
DLC (BF1.A55, v. 12)

Measurements were made of the time required

to identify one of four critical letters from a matrix of letters displayed tachistoscopically on circular fields ranging in size from 4 to 16 inches. Letters of four size/field ratios were tested. An interaction was found between letter size and field size, but there was no interaction with clutter. Performance was not improved by increases in field size beyond 12 inches.

8200

COMPLEXITY IN THE COCKPIT.—Aircraft (Toronto),
19 (10): 62, 65, 68, 108-110. Oct. 1957.
DLC (TL501.A56143, v. 19)

Complexity increase in cockpit design is described and discussed as it relates to pilot error as well as to difficulties arising from following the well-established concept "put everything in" followed at present by instrument and equipment designers and aeronautical engineers with the approval of pilots and reviewing boards. Suggestions offered to remedy the plight include: (1) using instrument and equipment designers and aeronautical engineers who understand fully the pilot's problems, (2) keeping an open mind on the part of pilots and crews when assessing new developments, and even more important (3) providing more statistical data, more time and motion studies, and more human engineering information to be used as a guide in making mock-up cockpit considerations. A new simplified approach is presented which suggests transferring greater amounts of routine translation of indicators from the pilot to machinery, with the pilot acting as a monitor exercising judgment or selecting alternate courses of action.

8201

DeBiasi, V.
NEW FIRE DETECTORS HAVE CONTINUOUS
SENSING.—Aviation Age, 27 (5): 74-77. May
1957.
DLC (TL501.A8187, v. 27)

Continuous-sensing fire detectors can use either an inorganic salt or a semiconducting thermistor as the sensing element. This article compares the design features of these two basically different approaches. (Author's abstract)

8202

Deutsch, S.,
and G. P. Schumacher
A COMPARISON OF FOUR AIRBORNE PLOTTING
SYSTEMS [Abstract].—Amer. Psychologist, 12 (7):
450-451. July 1957.
DLC (BF1.A55, v. 12)

A study was made of the relative effectiveness of present and proposed plotting techniques in the airborne navigation system. Four Navy aircrewmembers responded to system element stimuli and then to the overall task. Analysis of plotting errors and time for systems and subsystems revealed that a single-unit integrated plotter provided the most accurate and rapid information flow. Summation of plotting time for system elements almost doubled the time taken for the overall task.

8203

Fogel, L. J.
SYSTEMS ENGINEERING + HUMAN FACTORS =
HUMAN ENGINEERING.—Aviation Research &
Development, 2 (4): 16-17. April 1957.
DLC (UG630.M537, v. 2)

In considering the design of the aircraft cockpit,

the physiological effects of forces imposed on the human operator are considered along with psychophysical and psychomotor factors. Prior to production design, previous training programs, tracking studies, the information theory, and mathematical statistics are evaluated. Analysis is the basis for systems engineering design and related studies. These must be carefully oriented so that the cockpit environment will prove safe and comfortable.

8204

Foley, P. J.,
K. B. Jackson, and D. O. Blake.
A METHOD OF RECORDING AND MEASURING
LIMITS OF VISIBILITY FROM COCKPITS OF
CIVIL AIRCRAFT.—*Canad. Aeronaut. Jour.* (Ottawa),
3 (9): 310-311. Nov. 1957. DLC (TL501.C2713, v. 3)

A photographic technique for measuring and recording limits of visibility from aircraft cockpits is described. The description includes the camera, the method of operation, and the procedure of comparing measures taken with standard requirements. With the use of this method it is possible to determine at a glance if a specific aircraft meets the standard requirements.

8205

Gaito, J.
HUMAN ENGINEERING INVESTIGATIONS OF AIR-
CRAFT COCKPIT VISUAL DISPLAYS: THE CHOICE
OF SUBJECTS IN DIAL LEGIBILITY EXPERIMENTS
—A METHODOLOGICAL STUDY.—Naval Air Mate-
rial Center. Air Crew Equipment Lab., Philadelphia,
Pa. (Project no. TED NAM AE-7047, Part 17). Re-
port no. NAMC-ACEL-316, Feb. 8, 1957. v+12 p.
AD 123 218 PB 136 724

This study was concerned with investigating the validity of extrapolating results of an experiment based on one population to other populations. A paper and pencil test on aircraft clock designs was administered to experienced naval pilots, to naval non-pilot aircrew personnel, and to naval non-aircrew personnel. Using mean number of errors and mean time per reading as criteria of legibility, the three samples differed in most of the analyses. However, in no case did the relative effectiveness of the various clock designs change from one sample to another. Thus, these results would indicate that generally the findings based on one population may be used in extrapolating to another population. (Author's abstract)

8206

Gaito, J.
HUMAN ENGINEERING INVESTIGATIONS OF AIR-
CRAFT COCKPIT VISUAL DISPLAYS. PART 18.
SIZE AND SHAPE OF NUMERALS AND LETTERS
FOR DISPLAYS. I. PERCEPTUAL DEVELOPMENT
WITH SINGLE AND MULTIPLE STRAIGHT AND
CURVED LINE FORMS.—Naval Air Material Center.
Air Crew Equipment Lab., Philadelphia, Pa. (Project
no. TED NAM AE-7047). Report no. NAMC-ACEL-
351, Oct. 15, 1957. v+21 p. AD 144 893

UNCLASSIFIED

Three experiments concerned with perceptual development of single and multiple straight and curved line figures are reported. The four stimuli (a single straight line, a single curved line, two straight lines making an angle of approximately 140 degrees, and three perpendicular straight lines) were presented in an electronic tachistoscope at

increasing time intervals at a constant low luminance level until the subject correctly identified the figure. Analyses by the analysis of variance and content analysis techniques indicated that the straight line was perceived at the lowest time interval; the two multiple straight line forms, at the highest time interval; and the curved line, at an intermediate time interval. Statements concerning the implication of these findings for the development of letter and numeral fonts for aircraft displays are offered. (Author's abstract)

8207

Galanter, E.,
J. van Laer, and S. J. Klein
INVESTIGATIONS OF THE CHARACTERISTICS OF
ATTENTIONAL AND INFORMATIONAL TRANS-
MITTING VALUES OF AIRCRAFT SIGNAL INDICA-
TORS. II. THE WARNING SIGNAL PROBLEM:
CLARIFICATION AND EXPERIMENTAL DESIGN.—
Univ. of Pennsylvania, Philadelphia (Contract N156-
33966); issued by Naval Air Material Center. Air
Crew Equipment Lab., Philadelphia, Pa. (Project
no. TED NAM EL52004, Part 16). Report no. NAMC-
ACEL-356, Oct. 1, 1957. [18] p. UNCLASSIFIED

Two general problems arise from the use of warning signal systems in high-speed aircraft: (1) the relation between reaction latency and choice probability, and (2) distraction and attention and its dependence of signal level and motivational payoff. A pair of experiments are presented designed to investigate these problems by incorporating features that make the results generalizable to a wide variety of situations. On the one hand they aid in formalizing and testing parts of the theory of warning signal systems thereby providing for generality if the theory is supported. On the other hand, they make use of a new technique of functional simulation.

8208

Gardner, J. F.
THE EFFECT OF MOTION RELATIONSHIP AND
RATE OF POINTER MOVEMENT ON TRACKING
PERFORMANCE.—Wright Air Development Center.
Aero Medical Lab., Wright-Patterson Air Force
Base, Ohio (Project no. 7189, Task no. 71571).
WADC Technical Report no. 57-533, Sept. 1957.
v+20 p. AD 131 002 PB 131 659

UNCLASSIFIED

This report describes an experiment in which the subjects, using an aircraft-type stick control, attempted to keep the pointers on a simulated cross-pointer display on center in spite of random disturbances. Both the difficulty of the problem, expressed in terms of rate of pointer motion, and the motion relationship between control and display were varied. The effects on performance of these variations, singly and in combination, were assessed. The results indicate that: (a) tracking performance improves as the rate of movement of the pointers decrease; (b) the "fly-from" motion relationship is superior to its converse; (c) no significant interaction effects result from combinations of rates of pointer movement and direction of motion relationship; and (d) practice extending over 40 trials, each of 50 seconds duration, was not sufficient to nullify the effects of an adverse motion relationship or of higher rates of pointer motion. (Author's abstract)

8209

Gerathewohl, S. J.
CONSPICUITY OF FLASHING LIGHT SIGNALS:

EFFECTS OF VARIATION AMONG FREQUENCY, DURATION, AND CONTRAST OF THE SIGNALS.—
 Jour. Optical Soc. Amer., 47 (1): 27-29, Jan. 1957.
 DLC (QC350.O6, v. 47)

Same as the report, item no. 2791, vol. III.

8210

Gurevich, B. Kh.
 [ELECTROPHYSIOLOGICAL INVESTIGATIONS PERFORMED DURING ROTATION OF THE SUBJECT]
 Ob elektrofiziologicheskikh issledovaniyakh na vrashchalushchemsia ob'ekte. — Fiziologicheskii zhurnal SSSR (Moskva), 43 (4): 367-370, In Russian.
 DLC (QP1.F57, v. 43)

An apparatus is described which permits the recording of electrical potentials (electroencephalogram, electro-oculogram, etc.) on animals subjected to rotation. The device uses sliding contacts to connect the leads with the recording apparatus.

8211

Hartman, B. O.
 THE EFFECT OF JOYSTICK LENGTH ON PURSUIT TRACKING.—Army Medical Research Lab., Fort Knox, Ky. (Project no. 6-95-20-001, Subtask USAMRL S-1 MEDEA). Report no. 279, May 9, 1957. ii+11 p.
 AD 132 955 UNCLASSIFIED

Stick lengths of 6, 9, 12, 15, 18, 21, 24, and 27 inches were used to determine the effect of joystick length on the manual tracking at a continuous simple pursuit task. Performance changed systematically as stick length increased, improving up to 18 inches and dropping off above that point. Significant differences in performance were obtained for hits scores but not for time-on-target. Only the 27-inch stick differed significantly. An improvement of approximately 10% between the best and worst stick lengths was obtained. (From the author's abstract)

8212

Holding, D. H.
 THE EFFECT OF INITIAL POINTER POSITION ON DISPLAY-CONTROL RELATIONSHIPS.—Occupational Psychol. (London), 31 (2): 126-130, April 1957.
 DLC (T58.A2N35, v. 31)

An experiment on a new variable in display-control relationships is described showing that the position from which a display indicator begins its travel has an effect on the direction in which a control is moved by an operator who is unfamiliar with the equipment. Settings on a vertical scale were made by means of a rotary knob. Half of the settings were made upwards, and half downwards. The initial positions of the display pointer were at nine different distances along the scale for both groups of settings. There were 360 subjects, in 18 groups of 20 each, on each initial pointer position. The direction of rotation of the knob (clockwise or anticlockwise) was recorded. The predominant display-control relationships were: clockwise rotation for upward movement of the pointer, and anticlockwise for down. The pattern of responses for upward pointer movement was similar to the pattern for downward movement. The number of responses in the predominant direction was about 14 per cent less when the pointer began at either end of the scale than when it began in the middle. (Author's summary)

8213

Hoover, G. W.
 A NEW LOOK FOR AIRCRAFT INSTRUMENTATION.

—Office of Naval Research, Research Rev., 1957 (Feb.): 36-38. DLC (Q180.U5A354, v. 1957)
 Same as item no. 4374, vol. IV.

8214

Hoover, G. W.
 SPACE TRAVEL, A SYMPOSIUM: INSTRUMENTATION FOR SPACE FLIGHT.—Jour. Aviation Med., 28 (5): 495-498, Oct. 1957.
 DLC (RC1050.A36, v. 28)

The main requirements for all types of instrumentation are that the apparatus must be reliable, simple and lightweight in design, completely automatic, and, when used by men, designed so no interpretive error is possible. The development of instrumentation must be considered as important as any other part of the design. Instrumentation is classified as to use in manned and unmanned spacecraft. In manned craft instruments must provide information of flight path, altitude, power, and time. Instrumentation for orientation, positioning, and elevation is discussed. In unmanned craft many of these instruments will be automatic and need not be designed to be read. A diagram of instrumentation for perceiving velocity is given and explained. Pressurization leaks, radioactivity, and meteorite bombardments must be indicated in a warning system in the manned craft, while the instruments can be used for research in unmanned spaceships.

8215

HUMAN ENGINEERING EVALUATION OF THE FARRAND STAR TRACKER.—Dunlap and Associates, Stamford, Conn. (Contract Nord-17719); issued by Bureau of Ordnance. Special Projects Office, Washington, D. C. Memorandum Report no. 3, April 26, 1957. [8] p. AD 135 657 UNCLASSIFIED

A human engineering evaluation was made of the Farrand Star Tracker to identify human operator sources of error. This navigation system determines a ship's position by obtaining star sights (elevation and azimuth angles). The Farrand receiver unit is an image orthicon TV tube on which the star is visually presented as a blip. A reticle is tuned in on the scope face and the operator's task to tune in the reticle and star image to proper power for brightness, sharpness, and clarity. The star position is obtained by centering the star on the cross-hair reticle. Sources of operator difficulty in the control ratio, scope scale ratios, positioning controls, and console design are described. Recommendations are summarized for changes in the TV tube display, tracking control, and console design.

8216

Hunt, D. P.,
 and M. J. Warrick
 ACCURACY OF BLIND POSITIONING OF A ROTARY CONTROL.—Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio (Project no. 7182, Task no. 71514). WADC Technical Note no. 52-106, March 1957. iii+9 p.
 AD 142 291 PB 131 695

The accuracy of blindly positioning a bar-type rotary control knob was investigated. Four subjects made right-handed and left-handed blind settings with a tapered and with a parallel-sided knob. The range of the setting errors was approximately 28° for the tapered knob and 22° for the parallel-sided knob.

With the tapered knob the average difference between right-handed and left-handed settings was approximately sixteen degrees; whereas with the parallel-sided knob the average difference was less than two degrees. In general, the right-handed settings were more accurate between the nine and twelve o'clock positions and the left-handed settings more accurate between the twelve and three o'clock positions. For accuracy of blind setting, it appears that a parallel-sided bar knob is superior to a tapered bar knob and that, for ease of accurate setting, the spacing between discrete positions of the control should be approximately 35° or more. (Authors' abstract)

8217

Kappauf, W. E.,

K. R. Christensen, and C. G. McDiarmid
EFFECT OF SCALE DESIGN VARIABLES ON THE
OCCURRENCE OF SYSTEMATIC ERRORS IN SCALE
READING [Abstract].—Amer. Psychologist, 12 (7):
444. July 1957. DLC (BF1.A55, v. 12)

A study was made of the effect of the following design variables on scale reading errors: (1) scales numbered every five units or ten; (2) one, two, or four mm. widths of unit intervals; and (3) shading of alternate ten-unit segments of the scale. A marked reduction of errors was found with five-unit numbering. Scale expansion had minor effects, and shading had none.

8218

Katchmar, L. T.

PHYSICAL FORCE PROBLEMS. I. HAND CRANK
PERFORMANCE FOR VARIOUS CRANK RADII AND
TORQUE LOAD COMBINATIONS.—Aberdeen Proving
Ground. Human Engineering Lab., Md. Technical
Memorandum no. 3-57, March 1957. ii+15 p.
AD 126 991 UNCLASSIFIED

This study investigated the normal work output of 75 military subjects using various-size handcranks and turning against different resistant torque loads. Three different handcrank radii and five different torque loads were used. These were 4, 5, and 7 inches, and 10, 30, 50, 70, and 90 inch-pounds, respectively. The subjects were instructed to turn the crank at a rapid rate until they could not continue turning or were told to stop. The results were described graphically showing the cumulative work output for each of the handcrank-torque load combinations. (Author's abstract)

8219

Loveless, N. E.

SIGNAL DETECTION WITH SIMULTANEOUS VISUAL
AND AUDITORY PRESENTATION.—Univ. of Durham
(Gt. Brit.). Nuffield Dept. of Indus. Health; issued by
Flying Personnel Research Committee (Gt. Brit.).
Report no. FPRC 1027, Dec. 1957. 8 p. AD 201 167
UNCLASSIFIED

A comparison was made of the rate of detection of noise-masked signals with audio, visual, and audio-visual presentation. Bi-sensory presentation yielded a detection rate consistently higher than that obtained with the better uni-sensory display. Some subjects succeeded in achieving theoretically optimal performance with the bi-sensory display; that is, the probability of missing a signal was equal to the product of the probabilities of missing signals on the auditory and visual displays individually. Other subjects, however, failed to reach this criterion, either through difficulty in attending to two displays simul-

taneously or through adoption of an inferior strategy of decision. An increase in the number of sensory channels employed is capable of facilitating the detection of near-threshold signals, but specific training in the use of such a display is probably desirable. (Author's summary, modified) (25 references)

8220

Melani, J. F.

COCKPIT, INSTRUMENT, AND ANTI-COLLISION
LIGHTING FOR ARMY AIRCRAFT (INSTALLATION
AND EVALUATION OF COCKPIT AND INSTRUMENT
LIGHTING FOR THE L-19 AIRCRAFT).—Trans-
portation Research and Engineering Command, Fort
Eustis, Va. (Project 9-38-01-000, House Task 12.23).
[Unnumbered Report], April 1957, iii+35 p.
AD 120 506 UNCLASSIFIED

A variety of aircraft instrument- and cockpit-lighting systems were tested in order to determine the most suitable lighting arrangements for L-19 aircraft. It was found that instrument lighting could be improved by using individual lights for each instrument. The direct variable aperture lamp assembly was the best unit available for general cockpit lighting. (Author's abstract, modified)

8221

Miller, E. E.,

and J. A. Creelman

EVALUATION OF A "MOVING AIRPLANE" ATTI-
TITUDE INDICATOR DURING INSTRUMENT FLIGHT
INSTRUCTION [Abstract].—Amer. Psychologist,
12 (7): 453. July 1957. DLC (BF1.A55, v. 12)

Student learning under controlled field conditions was studied with attitude indicators in which either a miniature airplane or the artificial horizon was the moving element. Transition to the standard attitude gyro from the indicator with a moving airplane was found to be significantly easier than the opposite transition. Other slight differences in student learning tended to favor the standard attitude display.

8222

Morant, G. M.,

and H. P. Ruffell Smith

CRITICAL DIMENSIONS OF A STANDARD HELI-
COPTER COCKPIT.—RAF Inst. of Aviation Medicine
(Gt. Brit.), Farnborough; issued by Flying Personnel
Research Committee (Gt. Brit.). Report no. FPRC
1002, March 1957. [17 p.] AD 130 088

UNCLASSIFIED

A dual pilot cockpit was investigated to determine dimensions of significance to pilots. The mockup was adjusted to give the best arrangement for each subject, and the body measurements were recorded. With these data, a second series of mockup trials was made with subjects of more extreme sizes and adjustments, until the best possible arrangement was obtained. The adopted arrangement for the pilot's vision ranged from 20° with the lowest eye position to a maximum of about 30°. Distances recorded from the left eye to 5 points on the instrument panel showed eye distances to be within a 22.0- to 34.0-inch range. The maximum pedal travel without undue strain and with tight seat harness was ±4 inches. The best neutral pedal position was at an angle of about 11° between the upper surfaces of the thigh and lower leg. Also given are the limits of arm reach of pilots tightly harnessed in the right seat, adequate knee clearance from the instrument panel and thigh

clearance from both column controls, and eye heights above the horizontal (floor) datum for pilots in alert attitudes looking straight forward. (From the AD abstract)

8223

Neville, J. R.

A VOLTAMETRIC DEVICE FOR CONTINUOUS MEASUREMENT OF OXYGEN PARTIAL PRESSURE [Abstract]. — Federation Proceedings, 16 (1, part 1): 93. March 1957. DLC (QH301.F37, v. 16)

This device utilizes a gold electrode covered with an oxygen-permeable membrane, and a tungsten reference electrode. In tests run on gas mixtures (ranging from 0-100% oxygen and saturated with water vapor), the device has provided stable current output and given readings reproducible to within 1% oxygen. Day-to-day operation is more variable; however, the device is easily calibrated. Although dependent on the type of membrane used and the physical conditions affecting diffusion, the response time is fairly rapid: under optimum conditions, equilibrium is obtained within 3 seconds. (Author's abstract, modified)

8224

Noble, R.,
and J. Lazo

INVESTIGATION OF THE OPTIMAL CHARACTERISTICS OF VISUAL LIGHT INDICATOR SYSTEMS. — Jour. Aviation Med., 28 (2): 318-321. June 1957. DLC (RC1050.A36, v. 28)

Experiments were performed to evaluate the attention-getting qualities of the following types of caution and warning lights: steady, flashing, and dual alternating lights. The alternating type proved to be the superior attention-getter, especially when the stimulus was outside the visual field. The steady type is the least satisfactory. Geometric shape seems to have no effect on the attention-getting qualities of any of the three types. Flashing and alternating lights serve as a more effective means of maintaining a pilot's dark adaptation, in contrast to a steady light of much greater intensity.

8225

Poberli, A. V.

[ON DARK ADAPTATION] K voprosu o temnovoi adaptatsii [Abstract]. — Voenno-meditsinski zhurnal (Moskva), 1957 (7): 78-79. July 1957. In Russian. DLC (RC970.V55, v. 1957)

Twenty-five healthy pilots, 20-35 years of age, with normal vision, were exposed on dark nights to sky projector lights to determine the amount of time needed for adaptation to darkness following brief exposure to bright lights. The pilots tested were facing the projectors while sitting in an ill-illuminated plane cabin. The ability to read the airplane dials following such exposure was: 45 seconds in 12 men; 50 seconds in 10 men; and 60 seconds in 3 men. Pilots with previous night flight experience had the highest scores. One to three seconds were needed to read one dial. The tests were repeated 15 days later with similar results. One may assume that a well-lighted cabin would decrease the dial reading time. Crashes occurring under such conditions are not to be attributed to "temporary blindness" of the pilots, but to the loss of spatial orientation.

8226

Pollack, I.

EVALUATION OF THE PRINCIPLE OF A NOISE-OPERATED AUTOMATIC GAIN CONTROL SYSTEM FOR SPEECH COMMUNICATIONS [Abstract]. — Amer. Psychologist, 12 (7): 447. July 1957. DLC (BF1.A55, v. 12)

A noise-operated automatic gain control (AGC) system was designed for communication situations in which high noise levels are intermittently present. The AGC system is set high at high noise levels and low at low noise levels, so that an adequate signal/noise ratio is maintained under all conditions. Tests showed that the system is effective for speech communication over a wide range of noise conditions.

8227

PSYCHOLOGICAL ASPECTS OF COCKPIT DESIGN: A SYMPOSIUM REPORT. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio (Project no. 6190, Tasks no. 71573 and 71556). WADC Technical Report no. 57-117, April 1957. vi+137 p. AD 118 079 PB 131 189

The following papers and discussions are presented of the Wright Air Development Center symposium on the psychological aspects of cockpit design, held October 24 and 25, 1956: J. H. Kearns, The development of integrated display panels at WADC; J. Or-lansky, The development of integrated display panels in the Navy fixed-wing program; P. D. Courtney, The development of integrated display panels in the Navy rotary-wing program; S. N. Roscoe, The development of integrated display panels at Hughes Aircraft Company; M. L. Ritchie and H. E. Bamford, Research in the WADC instrument evaluation facility; W. G. Matheny, Cockpit research at Bell Helicopter Company; and J. R. Sheen, Cockpit research at the Glenn L. Martin Company. In addition to these papers a panel discussion was held on each of three subjects: Problems and methods in cockpit research, Problems and methods of whole-panel flight evaluation, and Whole-panel design objectives to be met in future aircraft. (25 references)

8228

Ritchie, M. L.,
and H. E. Bamford

THE EFFECT UPON THE OUTPUT OF A COMPLEX MAN-MACHINE SYSTEM OF QUICKENING AND DAMPING A DERIVATIVE FEEDBACK DISPLAY. — Univ. of Illinois, Urbana (Contract AF 33(616)-3000); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio (Project no. 6190, Task no. 71573). WADC Technical Report no. 57-103, April 1957. vi+25 p. AD 118 069 PB 131 211

Essentially the same published as: QUICKENING AND DAMPING A FEEDBACK DISPLAY. — Jour. Applied Psychol., 41 (6): 395-402. Dec. 1957. DLC (BF1.J55 v. 41)

Mounting the gyroscopic turn indicator on the sloping panel of an all-weather interceptor resulted in negative quickening of the display indication. Experiments in an electronic flight simulator demonstrated the adverse effect of negative quickening and the favorable effect of positive quickening on the output of the man-machine system. Damping the motion of the indicator needle also improved performance. The optimum combination appears to be the quickening produced by 5° of gyro tilt plus 500%

of normal damping. The findings are discussed in relation to a simplified model of the experimental man-machine system. (Authors' abstract)

8229

Rockway, M. R.

EFFECTS OF VARIATIONS IN CONTROL DEADSPACE AND GAIN ON TRACKING PERFORMANCE.—Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio (Project no. 7197, Task no. 71635). WADC Technical Report no. 57-326, Sept. 1957. iv+12 p. AD 118 347

PB 131 607

Six experimental subjects performed on a one-dimensional compensatory tracking device using each of the twelve control conditions resulting from combining four levels of control deadspace and three levels of gain. There was a systematic decrease in system performance with increasing control deadspace. In general, performance with the low and medium control gains was superior to performance with the high gain. The higher the control gain the greater the rate of decrease in system performance with increasing control deadspace. (Author's summary)

8230

Siegel, A. I.,

B. H. Fox, and F. W. Stirner

CAUTION AND WARNING LIGHT INDICATORS FOR NAVAL AIRCRAFT. II. AN INVESTIGATION INTO THE EFFECTS OF VARYING SIGNAL LIGHT SHAPES ON THE ATTENTION ARRESTING VALUE OF CAUTION AND WARNING LIGHT INDICATORS.—Applied Psychological Services, Villanova, Pa. (Contract N156s-33252); issued by Naval Air Material Center. Air Crew Equipment Lab., Philadelphia, Pa. (Project no. TED NAM EL 52004, Part 12). Report no. NAMC-ACEL-330, Feb. 27, 1957. ii+21 p. AD 134 415 UNCLASSIFIED

Two experiments are described on the effects of varying shape of signal lights on response when the subjects' major task was that of compensatory tracking. Maximal and minimal signal contrast conditions were employed with light signals of square, circular, triangular, and rectangular shapes. Additionally, light position, blinking and steady signals, and two surround brightnesses were included as experimental variables. The results of both experiments suggested strong support for the contention that little, if any, difference in attention-arresting value exists among the shapes tested. Furthermore, no one position of the four central light signal locations tested appears superior. (From the authors' abstract)

8231

Siegel, A. I.,

and F. W. Stirner

CAUTION AND WARNING LIGHT INDICATORS FOR NAVAL AIRCRAFT. IV. BACKGROUND VARIATION, LETTER SIZE, AND THE ADVANTAGES OF A MASTER INDICATOR WITH YELLOW CAUTIONARY SIGNALS IN A RED ILLUMINATED ENVIRONMENT.—Applied Psychological Services, Villanova, Pa. (Contract N156s-33252); issued by Naval Air Material Center. Air Crew Equipment Lab., Philadelphia, Pa. (Project no. TED NAM EL 52004, Part 14). Report no. NAMC-ACEL-347, Aug. 9, 1957. ii+22 p. AD 138 493 UNCLASSIFIED

An experiment was performed to investigate: (1)

the usefulness of a central master indicator used in conjunction with a peripherally located cautionary indicator panel, (2) the relative effectiveness of positive (opaque digits and illuminated background) and negative (opaque background and illuminated digits) cautionary legend displays, and (3) the optimum digit size for positive and negative cautionary legend displays. The subjects perceived multiple compensatory tracking to be their major task, and reaction to the cautionary and warning signals to be collateral tasks. Response time and number of missed signals constituted the data substrate. The results suggested that: (a) in conformity with previous work, a contention in support of the usefulness of the master seems warranted; (b) positive stimuli are to be preferred to negative stimuli for attention-attracting purposes; and (c) with positive stimuli under conditions similar to the present work and in terms of criteria employed, a 1/4" digit size is adequate, with negative stimuli the largest of the three digit sizes employed (3/8") appears to be superior. (Authors' abstract and recommendations)

8232

Sjoberg, S. A.,

W. R. Russell, and W. L. Alford

FLIGHT INVESTIGATION OF A SMALL SIDE-LOCATED CONTROL STICK USED WITH ELECTRONIC CONTROL SYSTEMS IN A FIGHTER AIRPLANE.—National Advisory Committee for Aeronautics. Langley Aeronautical Lab., Langley Field, Va. NACA Research Memorandum no. L56L28a, March 11, 1957. 43 p. AD 125 371 UNCLASSIFIED

Results are described of a flight test program in which a small stick (about 4 inches long) mounted at the end of an arm rest at the pilot's side was used as the airplane maneuvering flight controller. The side-located controller was used with both a rate automatic control system and an irreversible electronic power control system. Rapid and universal maneuvering was accomplished with either of these control systems. (Authors' abstract)

8233

Snodgrass, R. P.

TAKE-OFF AIDS TO PILOTS.—Skyways, 16 (10): 24, 89-91. Oct. 1957. DLC (TL501.S634, v. 16)

Flight Safety Research statistics show a real requirement for over-all take-off monitoring instrumentation to assist the pilot in evaluating his take-off performance. Such instrumentation should provide a continuous display of the take-off performance starting at the point of brake release. This display should be of an essentially static pointer type of indication. Of slightly less importance is a stop-distance warning system. This display can be of a go/no-go type of indication. Take-off monitor instrumentation should reduce the incidence of accidents caused by erroneous judgment of the pilot during take-off by providing him with an over-all performance index. (Author's conclusions)

8234

Steier, H. P.

HUMAN FACTORS: KEY TO EQUIPMENT RELIABILITY.—Amer. Aviation, 21 (7): 43-44. Aug. 26, 1957. DLC (TL501.A675, v. 21)

A new report summarizing reliability studies in military electronic equipment reveals the human element as a dominant cause of unreliability. The report was made by the Aeronautical Radio Inc.'s Reli-

ability Department, Washington, D. C. Some of the investigations upon which the report is based are described. From these studies it is concluded that inadequate attention is given to human-engineering aspects of military equipment design. Other factors are also singled out but the human-factors element is blamed for causing the greatest stresses. This concerns such matters as number of positioning of adjustments and switches and controls. It is believed that there is reason to emphasize human engineering even more than actual performance capabilities of equipment.

8235

Sweeney, J. S.,

A. W. Bailey, and J. F. Dowd
COMPARATIVE EVALUATION OF THREE
APPROACHES TO HELICOPTER INSTRUMENTA-
TION FOR HOVERING FLIGHT.—Naval Research
Lab., Washington, D. C. (Project no. NA 550-010).
Report no. 4954, June 1957. ii+31 p. AD 141 504
UNCLASSIFIED

The relative effect on hovering precision of three display systems is studied: conventional, helicopter attitude and groundspeed displayed on separate indicators; integrated, attitude and groundspeed information displayed combined into a single display; and quickened, attitude and other derivatives summed to a single indication of groundspeed through appropriate feedback circuitry. The primary operator task was to minimize translational motion while the vehicle was subject to simulated gust disturbances; the secondary task was to control heading in addition to the primary assignment. In terms of error scores there was a 1:4:6 ratio for quickened, integrated, and conventional display systems, respectively. When the secondary task was imposed, hovering performance on all systems was adversely affected but the ratio of effectiveness was essentially unchanged. (Authors' abstract, modified)

8236

Wright, N. L.,

and J. L. Seminara

READABILITY OF CHARACTERS BACKLIGHTED
BY SELF-LUMINOUS MATERIALS [Abstract].—
Amer. Psychologist, 12 (7): 453. July 1957.

DLC (BF1.A55, v. 12)

A study was made of the effects of color (green or yellow), brightness, and state of dark adaptation on the readability threshold of "alphametical" characters ranging in size from .12 to .24 inches, backlit by luminous radioactive materials.

d. Simulators and Analogues

8237

Adams, J. A.

SOME CONSIDERATIONS IN THE DESIGN AND USE
OF DYNAMIC FLIGHT SIMULATORS.—Air Force
Personnel and Training Research Center. Operator
Lab., Lackland Air Force Base, Tex. Research Re-
port no. AFPTRC-TN-57-51, April 1957. v+25 p.
AD 126 382 UNCLASSIFIED

Certain present-day, whole-task and part-task flight simulators are examined in relation to stated proficiency measurement and training criteria. The experimental literature on transfer of training is surveyed and related to fidelity-of-simulation problems. The major shortcoming of whole-task simulators is that they do not simulate enough of the air-

crew job-complex. Part-task simulators can be used in aspects of training for aircraft for which no whole-task simulator is available or for formal supplementary training when neither whole-task simulator nor aircraft time is sufficient to develop adequate proficiency in an important subtask of the mission. An analysis of certain part-task simulators now in use indicates that a principal problem is "how much to simulate." When flight simulators are used for proficiency measurement, the concern is not with transfer of training but with accurate reflection of inflight performance and the reliability of measurement. (24 references)

8238

Childerhose, R. J.

FLYING THE CF-100 SIMULATOR.—Aircraft
(Toronto), 19 (4): 21-22, 25, 75. April 1957.

DLC (TL501.A56143, v. 19)

A test flight is described of a production model of the Canadian Aviation Electronics CF-100 flight simulator. This device is designed to fulfill the following four major functions: (1) transition and familiarization training, (2) in-flight emergencies training, (3) tactical training and interception techniques, and (4) radar and rocket attack training. The simulator is believed to be unique in that it provides both flight and weapon system training for a crew of two.

8239

Christian, G. L.

TRAINER STRESSES COMPLETENESS, LOW COST.—
Aviation Week, 66 (3): 81-82. Jan 21, 1957.

DLC (TL501.A8, v. 66)

An aircraft procedures trainer is described which is more complete than earlier models but less complex and expensive than simulators. It was designed and built by Burton-Rodgers Technical Training, Inc., for use by American Airlines in its flight-training program. The new trainer is capable of serving as a procedures trainer covering such phases as cockpit familiarization, engine and propeller operation, and fuel management. It can be used for two different aircraft (Douglas DC-6A Liftmaster cargo plane and DC-7 passenger transport) each having certain important differences in its cockpit controls and instrumentation. The device is designed also for quick disassembly and easy shipping.

8240

Cross, C. A.

LANDING A ROCKET ON THE MOON.—Aeronautics
(London), 37 (1): 128-129. Sept. 1957.

DLC (TL501.A5512, v. 37)

An analogue computer is described which simulates a rocket falling vertically on the moon. If the rocket motor is not used, the rocket crashes, but by correct operation of the motor it may be retarded so as to make safe landing. The analogue has been used to test the performance of individuals making such a landing by manual control. Contrary to expectation it was shown that most people can be trained to land the rocket safely. (Author's abstract)

8241

ERCO DEVELOPS KC-135 FLIGHT SIMULATOR.—
Aviation Week, 66 (21): 34-37. May 27, 1957.

DLC (TL501.A8, v. 66)

The flight simulator for the Boeing KC-135 jet

tanker was delivered to the Air Force before the first aircraft was ready for operation. The program is described which facilitated speedup of delivery, making it possible for the Strategic Air Command to obtain maximum benefit from the training device before the arrival of regular production versions of the KC-135. The simulator incorporates the latest configurations and performance characteristics of the jet tanker. The machine is an analog computer, complete with radio, autopilot, and refueling factors in addition to regular flight controls.

8242

Havron, M. D.,
and L. F. Butler

EVALUATION OF TRAINING EFFECTIVENESS OF THE 2-FH-2 HELICOPTER FLIGHT TRAINER RESEARCH TOOL.—Psychological Research Associates, Arlington, Va. (Contract Nonr 1915(00)); issued by Naval Training Device Center, Port Washington, N. Y. (NAVTRADEVEN Project no. 20-OS-16). Technical Report no. NAVTRADEVEN 1915-00-1, April 1, 1957. viii+[150] p. AD 125 465

UNCLASSIFIED

An evaluation was made of the effectiveness of the device 2-FH-2, helicopter flight trainer research tool. The device consists of a unique type of visual display, a cockpit with activated instruments and controls, and a generalized flight system computer. It is designed to approximate in a general way the flight characteristics of the Bell HTL-4 helicopter. The device did not demonstrate any training advantage over the routine method of training in helicopter basic flight training.

8243

Kogan, I. R.

[HEATING EQUIPMENT OF THE ALTITUDE CHAMBER PBK-50] Ustroistvo dlia obogreva barokamery PBK-50. — Voenno-meditsinskii zhurnal (Moskva), 1957 (9): 84-85, Sept. 1957. In Russian. DLC (RC970.V55, v. 1957)

A description is given of the heating equipment installed in a transportable decompression chamber, which makes it possible to use the chamber at any season of the year.

8244

Lawden, D. F.

THE SIMULATION OF GRAVITY.—Jour. Brit. Interplanetary Soc. (London), 16 (3): 134-140, July-Sept. 1957. DLC (TL790.A1B7, v. 16)

The artificial gravitational field produced by rotating a spaceship or artificial satellite about its axis is compared and contrasted with normal gravity at the Earth's surface. Consideration is given to the centrifugal field and coriolis forces which act upon the spaceship.

8245

Lewis, C.

HELICOPTER SIMULATOR IS RESEARCH TOOL.—Aviation Week, 67 (18): 107, 109, Nov. 4, 1957. DLC (TL501.A8, v. 67)

A unique helicopter simulator developed by Bell Aircraft Corp. is described which will be used for psychological testing of various displays to determine an optimum display system for simple, efficient helicopter operation. The simulator is built around a closed sheet-metal cabin equipped with a seat, flight

controls, and a contact analog display. The display presents two pictures to the pilot, one representing a view straight ahead and the other a view downward at a 45° angle. These pictures are presented on two 17-inch cathode ray tubes. The testing program, subject source, and human engineering program for the simulator are also described.

8246

LINK JET TRAINER MAY CUT FLIGHT-MAINTENANCE COSTS 60%.—Amer. Aviation, 21 (11): 83, Oct. 21, 1957. DLC (TL501.A675, v. 21)

A new electronic jet engine trainer developed by the Link Aviation Inc., Binghamton, N. Y., is described, which, company officials suggest, will reduce airline costs about 60% in training flight and maintenance crews for the jet age. The Link unit is designed to simulate the performance of the Pratt and Whitney JT-3 and JT-4 (military J57 and J75) engines to be used by most airlines in Boeing 707 and Douglas DC-8 jets. Major components of the trainer are: (1) an operable model of the jet engine scaled to a length of about six feet; (2) a pilot's engine instrument panel and control pedestal; (3) a system engineer's station having the same instruments and appearance as the aircraft installation; and (4) an instructor's station with controls needed to simulate failures and emergency conditions as well as normal variable operating conditions. The savings would be produced by using the trainer to take over about half of the task that normally would be accomplished using the actual jet aircraft with "live" engines for training.

8247

Makinson, W.,

and G. M. Hellings

SYNTHETIC AIDS TO FLYING TRAINING.—Jour. Royal Aeronaut. Soc. (London), 61 (560): 509-528, Aug. 1957. DLC (TL501.R7, v. 61)

The development of techniques used in handling flight trainers is traced, and modifications under consideration are outlined. Description of the following is presented: Link vacuum-operated trainers, day-landing trainer, mechanical analogue computer elements in modern flying trainers, electronic computers integrated into flight trainers, and strip-card servo units. Flight simulators provide the trainee with realistic sensory effects (noise, buffet, vibration), control loading, physical accelerations, and the external scene.

8248

Rodwell, R. R.

FACTITIOUS FLYING FOR V-BOMBER CREWS.—Aeronautics (London), 37 (2): 46-47, Oct. 1957. DLC (TL501.A5512, v. 37)

Phases of operations of the Bomber Command are described with particular reference to the use of flight simulators. The Bomber Command's insistence upon perfection is demonstrated by the long period which the third and lastest Valiant simulator was withheld from training use before final acceptance was granted. The importance of the crew chief (and specialists in engine, airframe, instrument and electronics maintenance working under him) with complete responsibility for the total maintenance of one particular aircraft is stressed.

e. Airplanes and Space Cabins and Cabin Equipment

[Instruments and controls under 11-c; Protective
equipment under 10-b]

8249

Baker, R. C.,
and A. I. Siegel

AN OPERATIONAL EVALUATION OF IMPROVED
PROTOTYPE SEAT CUSHION ASSEMBLIES.—
Applied Psychological Services, Villanova, Pa. (Con-
tract N156-33968); issued by Naval Air Material
Center, Air Crew Equipment Lab., Philadelphia, Pa.
(Project no. TED NAM AE-5225.1). Report no.
NAMC-ACEL-354, Oct. 3, 1957. iv+32 p.+3 photo-
graphs. AD 143 554 UNCLASSIFIED

Three prototype seat cushion assemblies were
compared with each other and with the current
standard assembly found in naval AD-5 type aircraft.
Rankings by pilots of the flight discomfort reduction
of the prototype assemblies as compared with the
standard indicated statistically significant differ-
ences among all three of the prototype assemblies
and the standard. Rating data indicated statistically
significant differences between only two of the ex-
perimental assemblies and the standard. No statis-
tically significant differences were evidenced be-
tween any of the experimental seats. However,
certain auxiliary data as well as interview reports
clearly indicated that the addition of a sheet of
Trilok (a 3-dimensional plastic fabric) to the back
and extending upward underneath the harness straps
would unquestionably alter the evaluations in favor
of the static air cushion. Additionally, it was found
that, regardless of the type of seat assembly flown,
there were frequent complaints about pains in the
lumbar region. (From the authors' summary and
conclusions)

8250

Bowman, N. J.
THE FOOD AND ATMOSPHERE CONTROL PROBLEM ON SPACE VESSELS.—In: Realities of space
travel, p. 275-291. Ed. by L. J. Carter. London:
Putnam, 1957. DLC (TL790.A1B718)

Same as items 1132 and 1133, vol. II (1953).

8251

Hawkes, R.
MEDICS HIT INDUSTRY ATTITUDE.—Aviation
Week, 66 (19): 42. May 13, 1957.
DLC (TL501.A8, v. 66)

A disputation over the aviation industry's attitude
toward rear-facing airline seats and other crash-
survival techniques was touched off at the Aero
Medical Association's annual meeting, held in Den-
ver, Colo. A resolution by medical doctors urging
upon Civil Aeronautics Administration a requirement
for aft-facing seats was refused by the resolutions
committee. Instead, a resolution was reported out
of the committee which asked the association to set
up a study group to weigh the advantages of aft and
forward seats.

8252

Ingram, W. T.
SKIN EXCRETIONS.—New York Univ. Coll. of
Engineering, N. Y. (Contract AF 18(603)-71);
issued by Air Force Office of Scientific Research,
[Washington, D. C.]. AFOSR Report no. 58-270, Oct.
1957. 8 p. AD 154 171 UNCLASSIFIED

Occupants of a closed space will find it necessary
to give special attention to personal hygiene. Skin
excretions will have to be removed carefully with
minimal amounts of water. While dry washings with
special preparations may be considered, these wash-
ing compounds may contribute to contamination of the
enclosed air mass. Further, dry washings cannot be
considered as a complete substitute for some form of
washing that will raise and carry off the accumulation
of sebum and concentrated salts remaining after
water evaporation. While the quantities of organic
materials, water, and water vapor released to the
atmosphere from skin excretion may seem inconse-
quential in a normal atmosphere subject to air re-
plenishment, the accumulative effect of these materi-
als, some toxic and some odor producing on deterior-
ation, in conditions of a closed ecology remains to be
determined.

8253

Koolstra, J. A.,
and N. O. Harris
METABOLIC STUDIES WITH LACTOBACILLUS
UNDER CERTAIN SPACE FLIGHT CONDITIONS.—
School of Aviation Medicine, Randolph Air Force
Base, Tex. Report no. 58-39, Dec. 1957. 4 p.
AD 152 814 PB 134 875

Results obtained in this investigation demon-
strated that short-term exposure of *Lactobacillus*
casei to an altitude of 16,000 feet in an atmosphere
of 40 percent oxygen, 0.06 percent carbon dioxide,
and 59 percent nitrogen (space flight conditions) did
not affect the growth, the acid production, nor the
potassium and sodium uptake. Exposure to other
reduced pressures ranging from 13,000 to 55,000
feet without oxygen enrichment also had no effect
on metabolic patterns studied. (Authors' abstract)

8254

Palevsky, G.
HANDLING AIR CONTAMINANTS RESULTING FROM
A CLOSED ECOLOGICAL SYSTEM.—New York Univ.
Coll. of Engineering, N. Y. (Contract no. AF 18(603)-
71); issued by Air Force Office of Scientific Re-
search [Washington, D. C.]. AFOSR Report no.
58-269, July 1957. 16 p. AD 154 170 PB 137 797

The control of temperature, humidity, air motion,
foreign matter, microorganisms, air conditioning,
and water supply in creating an acceptable environ-
ment for human working in a closed ecological sys-
tem is discussed. Each factor is considered singly
and in relationship to the others. (29 references)

8255

A RADICAL APPROACH TO SEAT DESIGN.—Aeronau-
tics (London), 37 (1): 157. Sept. 1957.
DLC (TL501.A5512, v. 37)

A new airplane passenger seat is described of
glass fiber and polyester resin using metal only for
moving parts and for holding low bolts and their re-
inforcing plates. The new seat offers a saving in
both cost and weight as well as ability to absorb
energy before fracture and after fracture lacking
the jagged edges which are common with broken
metal.

8256

SHOCK ABSORBING SEAT REDUCES INJURIES.—
Aviation Week, 66 (14): 61. April 8, 1957.
DLC (TL501.A8, v. 66)
A Chance Vought-designed shock absorbing seat to

reduce the number of back injuries suffered in hard landings is described. The seat is suspended on a stainless steel strap which is secured at its upper end to the cockpit bulkhead behind the seat. In a dangerously hard landing or in nosewheel collapse, the strap stretches several inches to absorb excess kinetic energy. Two airplanes with instrumented seats and dummies installed were subjected to simulated hard landings. One was used to determine loads transmitted by standard seats and the other was used to test the new suspension and cushion. A significant reduction in loads was registered for the latter.

8257

Siegel, A. I.

AN EXPERIMENTAL FLIGHT EVALUATION OF PROTOTYPE SEAT ASSEMBLIES FOR NAVAL PILOTS [Abstract].—*Amer. Psychologist*, 12 (7): 451. July 1957. DLC (BF1.A55, v. 12)

In-flight tests were made of eight aircraft seat cushion assemblies intended to reduce fatigue, aching, numbness, and hyperperspiration. A seat incorporating air pulsation and Tri-lok surfacing was found to be the most acceptable.

8258

Slechta, R. F.,

E. A. Wade, W. K. Carter, and J. Forrest
COMPARATIVE EVALUATION OF AIRCRAFT SEATING ACCOMMODATION.—*Tufts Univ. Bio-Mechanics Lab., Medford, Mass. (Contract no. AF 33(616)-3068)*; issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. (Project no. 7215, Task no. 71724). WADC Technical Report no. 57-136, April 1957. vii+112 p. AD 118 097 PB 131 560

Eighteen subjects, selected to represent a wide range of the body sizes in the Air Force population, were seated in each of six seats for tests up to 7 hours in duration. Summaries of data and discussions of statistical techniques are presented in appendices. Statistical separation of the seats was demonstrated in analyses of data from voluntary sitting time and other techniques. Statistical treatment of sitting time data from twelve subjects gave essentially the same results as those obtained with 18 subjects. Localized discomfort in the back and buttocks was found more important than discomfort in the thighs, neck, shoulders, and lower legs in producing general discomfort. Seat parts were analyzed for their relative importances in achieving comfortable seating. (From the authors' abstract)

8259

Slechta, R. F.,

and E. A. Wade

A COMPARATIVE STUDY OF COMFORT EVALUATION METHODS [Abstract].—*Amer. Psychologist*, 12 (7): 444. July 1957. DLC (BF1.A55, v. 12)

A standard battery of questionnaire items was administered hourly to 18 subjects representing a wide range of body sizes during seating in various aircraft seats for up to 7 hours. The seats were found to be statistically separable in terms of sitting time and ratings assigned on a structured scale of comfort. Relative seat preferences were highly consistent according to hourly predictions of anticipated

tolerance for discomfort and scaled evaluation of comfort.

f. Kitchen and Sanitary Facilities

[General sanitary aspects under 8-f]

8260

Hogan, G. W.

AN ELECTRICAL INCINERATOR TOILET FOR AIRCRAFT. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio (Project no. 6356, Task no. 63158). WADC Technical Report no. 57-397, June 1957. iii+17 p. AD 130 845 UNCLASSIFIED

An improved model of the United Machine Company's IT-100-1 electric incinerator toilet was submitted for evaluation. The design characteristics have been greatly improved over the original model tested by this Center in March 1955. This model experienced no failure in the vibration tests. The mechanics of the improved model remain the same. These tests show no substantial improvement in incineration time. Certain changes are evident and will be discussed with the manufacturer for inclusion. It is planned to revise MIL-T-25332 accordingly. The improvements already made and those which can yet be worked out should thoroughly satisfy the exceptions thus far taken to MIL-T-25332 by several airframe manufacturers. The performance limitation of this toilet limits its usefulness to that of bomber and cargo crew facility. In its present form, the toilet may be installed and used to advantage and is considered an improvement over the chemical type (bucket) toilet now in use. However, there are certain needed improvements. (Author's abstract)

g. Flight and Space Feeding

[Basic nutritional studies under 3-f; Emergency rations under 10-d]

8261

Finkelstein, B.

NUTRITION STUDY FOR LONG RANGE AIRCRAFT (INITIAL PHASE).—Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio (Project no. 6335). WADC Technical Note no. 57-217, May 1957. vi+15 p. AD 130 756 UNCLASSIFIED

A preliminary nutrition study designed to investigate feeding requirements for long-range, high-performance aircraft is described. A group of five men participated in this five-day study. All food was stored in an experimental crew compartment galley. Meals simulating those which would be served in flight were consumed. Between meals, snacks were available. The adequacy and acceptability of the feeding program are evaluated. In addition, an evaluation is made of the functional utility of the experimental galley. Suggestions for certain design improvements in future prototypes of this galley are included. (Author's abstract)

8262

Gordon, J. J.

THE IN-FLIGHT FEEDING OF CARRIER AVIATORS.—*Contact (Pensacola)*, 15 (1): 31-32. 1957.

DNLM

In-flight feeding of carrier aviators, where 90% of the long flights are in single-place aircraft, consists primarily of a picnic lunch (sandwich, fried chicken, hard boiled eggs, juice, celery and carrot slices, juice, candy) which is ready to eat, requires no fixing or mixing in the air, and maintains palatability for 5-8 hours.

8263

Mock, R. O.

ACCEPTABILITY TEST OF LIQUID MEATS.—

Wright Air Development Center, Aero Medical Lab, Wright-Patterson Air Force Base, Ohio (Project no. 7156). WADC Technical Note 57-63, Feb. 1957. iv+7 p. AD 118 066 UNCLASSIFIED

Two experimental liquid-chicken and two experimental liquid-ham formulations were tasted by the test pilots on the ground. Saltiness, thickness and flavor were "about right" in most of the formulations and only a small minority rated the items as having an objectionable aftertaste. A number of subjects stated that the chalky or grainy texture was objectionable. All four liquid meats rated high enough in acceptability to be considered for further testing in high-performance aircraft at extreme altitudes. (From the author's abstract)

8264

Petrovykh, V. A.,

P. P. Lobsin, Iu. F. Udalov, and M. I. Kuznetsov [PILOT'S PREFLIGHT DIET] Predpoletnoe pitanie letchika [Abstract]. — Voenno-meditsinskii zhurnal (Moskva), 1957 (7): 80. July 1957. In Russian. DLC (RC970.V55, v. 1957)

Thirty-one experiments were conducted in an altitude chamber at 12,000-15,000 m. simulated altitude. Two kinds of food rations were given equal in caloric value (4500 Kal.): "Preflight meal" serving as control, and "Experimental ration" containing increased amounts of vitamins A, B₁, B₂, and C, mineral salts, and cellular tissue. There was no difference in the physiological indices after consumption of either diet (respiratory and pulse rate, systole; reflex activity, etc.). The "Experimental ration", having more vitamins and minerals, and less bread and cabbage, seems to be preferable to the standard "Preflight ration".

8265

Taylor, A. A.,

and R. N. Costilow

BACTERIOLOGICAL STUDY OF FOIL PACK IN-FLIGHT MEALS DURING REFRIGERATED STORAGE.—

Wright Air Development Center, Aero Medical Lab., Wright-Patterson Air Force Base, Ohio (Project no. 7156). WADC Technical Note 57-73, March 1957. iii+5 p. AD 118 096

UNCLASSIFIED

A bacteriological study was made of the meat, vegetable, and potato components of Foil Pack Meals prepared under USAF operational conditions. These foods were analyzed for mesophilic, psychrophilic, coliform, and gram-positive coccus types of bacteria. Results indicate that total numbers of mesophilic, psychrophilic and coliform organisms do not increase significantly when foods of the Foil Pack Meal are kept under refrigeration up to 120 hours. In addition, the foods studied can be prepared with low populations of all four types of bacteria for which analyses were made. It is concluded that food spoilage will not be a problem when the perishable

components of Foil Pack Meals are stored for five days under refrigeration temperatures; and the food poisoning potential of Foil Pack Meals consumed within five days after packaging is no greater than that of meals served in Air Force dining halls. These conclusions are based on the use of routine sanitation practices and refrigeration temperatures of less than 40°F. (Authors' abstract)

h. Disposal and Utilization of Waste Products

[Basic studies on ecological systems under 2-b]

8266

Bowman, N. J.

THE FOOD AND ATMOSPHERE CONTROL PROBLEM ON SPACE VESSELS. I. CHEMICAL PURIFICATION OF AIR. II. THE USE OF ALGAE FOR FOOD AND ATMOSPHERE CONTROL.—In: Realities of space travel. p. 275-291. Ed. by L. J. Carter. London: Putnam, 1957. DLC (TL790.A1B718)

Same as items no. 1132 and 1133, vol. II (1953).

8267

Masson, H. J.

STUDY OF METHODS FOR OBTAINING OXYGEN FROM CARBON DIOXIDE.—New York Univ. Coll. of Engineering, N. Y. (Contract AF 18(603)-71); issued by Air Force Office of Scientific Research, Washington, D. C. AFOSR Report no. 57-379, June 1957. 18 p. AD 132 453 UNCLASSIFIED

A literature study is presented of means of treating carbon dioxide to recover oxygen and convert the carbon to a useful form or compound. This study is a part of a project studying ecological problems in a closed system such as that which exists in a space ship. A bibliography of 40 references is included as well as a brief outline of experimental investigations which appear to be fruitful.

8268

Slote, L.

THERMAL ENERGY EXCHANGE WITH SPECIFIC APPLICATION TO WASTE HANDLING IN A CLOSED ECOLOGICAL SYSTEM.—New York Univ., Coll. of Engineering, N. Y. (Contract AF 18(603)-71); issued by Air Force Office of Scientific Research, Aeronautical Division, Washington, D. C. AFOSR Report no. 58-268, July 1957. 7 p. AD 154 169

UNCLASSIFIED

One of the basic methods proposed in treating human waste products is the application of thermal energy to the cracking of the waste with byproduct recovery. Both high temperatures for the cracking and low temperatures for the condensation of the byproduct must be available. An analysis is presented attempting to show the variation in the total surface temperature of a perfect heat-conducting or spinning satellite for a given orbit and for various conditions of irradiation. As the thermal capacity of the satellite is reduced, a temperature distribution is obtained about the surface of the sphere. Therefore it becomes evident that various temperatures can be obtained depending upon the geometry, surface, and trajectory of the biosatellite. With this in mind, it seems feasible to use thermal energy sources in connection with processes for cracking of human waste and for purification of urine by freezing, if these processes are used.

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